NACA

RESEARCH MEMORANDUM

THE HYDRODYNAMIC FORCE CHARACTERISTICS OF STREAMLINE BODIES OF REVOLUTION HAVING FINENESS RATIOS OF 6,

9, AND 12 WITH AND WITHOUT CHINE STRIPS

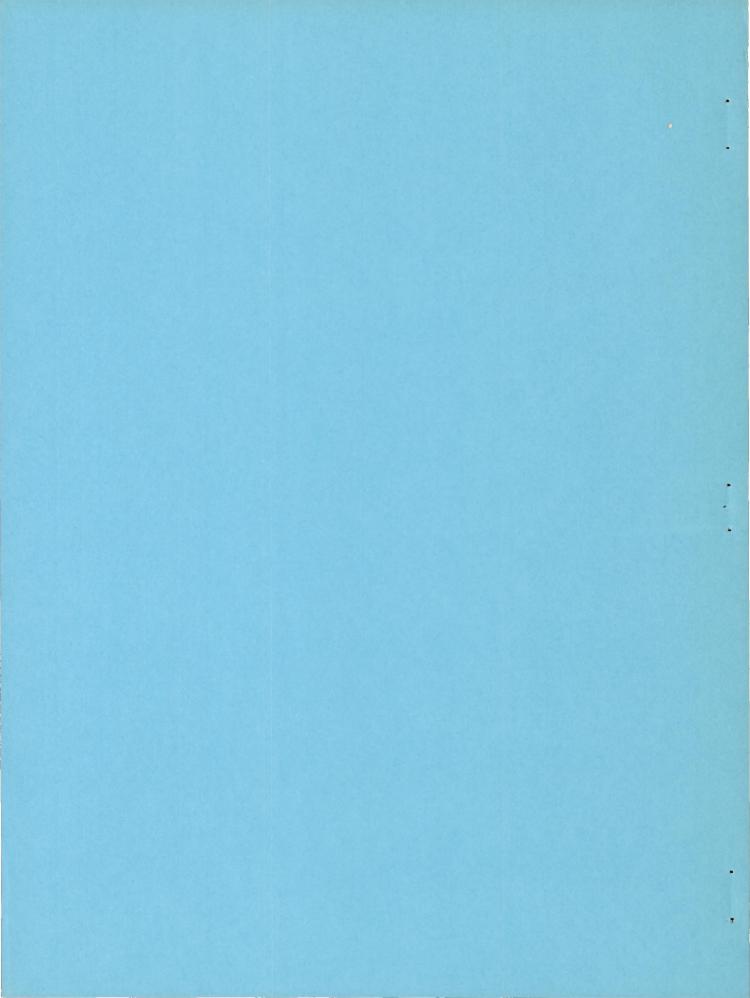
By Bernard Weinflash and Rudolph E. Fontana

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NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

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THE HYDRODYNAMIC FORCE CHARACTERISTICS OF STREAMLINE
BODIES OF REVOLUTION HAVING FINENESS RATIOS OF 6,

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SUMMARY

Hydrodynamic force characteristics, as determined by general tank tests, are given for three streamline bodies of revolution equipped with chine strips and having fineness ratios of 6, 9, and 12, respectively. In addition, these force characteristics are given for the same bodies with the chine strips removed and, to a limited extent, for the same bodies with the tail cones removed.

Hydrodynamic resistance, pitching moment, wetted length, and height of the model above the water surface are tabulated for a range of trim, load, and speed. In order to facilitate analysis, the curves are plotted using hydrodynamic coefficients which generally group along single curves for all speed-load combinations.

INTRODUCTION

The usefulness of hydro-skis as a means of obtaining high-speed, water-based airplanes with a minimum of compromise to their aerodynamic performance was presented in reference 1. In that investigation, the hydro-skis were incorporated in a streamline fuselage because such a fuselage offers aerodynamic and structural advantages. It was demonstrated in reference 2 that the hydrodynamic performance of this configuration was influenced to a large degree by the hydrodynamic characteristics of the fuselage. The hydrodynamic performance of this fuselage equipped with hydro-skis was greatly improved by the addition of narrow longitudinal strips on the lower rear portion of the fuselage. Other investigations (refs. 3 to 7) also indicate that simple modifications to streamline fuselages greatly improve their usefulness as fuselages of water-based airplanes. These investigations indicate that full-length, narrow strips located port and starboard of the lower profile line would be generally the most desirable configuration.

The primary purpose of this paper is to provide general hydrodynamic force data on streamline bodies of revolution of fineness ratios 6, 9, and 12 with and without chine strips. Since the data obtained may prove useful in the design of hydrodynamic bodies other than fuselages for skiequipped seaplanes, the scope of the investigation was extended to speeds beyond the current ski-emergence speeds of such aircraft. Tests were made on three models having the same nondimensional offsets and the same volume but differing in fineness ratio. Corresponding tests were also made on the models with the strips removed. In addition, limited tests were made on the models equipped with chine strips but with a small portion of the aft end removed to simulate a fuselage with jet exhaust. Values of resistance, trimming moment, wetted length, and height of the model above the water surface are presented for a wide range of trim, load, and speed.

SYMBOLS

CD drag coefficient based on volume of fuselage,

$$\frac{R}{\frac{1}{2}\rho Q^2/3V^2} = \frac{2C_{R_Q}}{\left(C_{V_Q}\right)^2}$$

 $^{\mathrm{C}}_{\mathrm{D}}.$ drag coefficient based on load, $^{2\mathrm{C}}_{\mathrm{R}_{\mathrm{O}}}$

$$\frac{R}{\frac{1}{2}\rho(\Delta/w)^{2/3}V^2} = \frac{\frac{2C_{R_Q}}{C_{\Delta_Q}}^{2/3}(C_{V_Q})^2}{\left(\frac{C_{\Delta_Q}}{C_{\Delta_Q}}\right)^{2/3}\left(\frac{C_{Q}}{C_{Q}}\right)^2}$$

 $C_{\mathrm{L}_{\mathrm{a}}}$ lift coefficient based on volume of fuselage,

$$\frac{\Delta}{\frac{1}{2}\rho Q^2/3 V^2} = \frac{2C \Delta_Q}{\left(C_{V_Q}\right)^2}$$

 c_{M_Q} trimming-moment coefficient based on volume of fuselage, $\frac{M}{WO^{\frac{1}{4}/3}}$

 C_{R_Q} resistance coefficient based on volume of fuselage R/wQ = 0.0467R

 C_{V_Q} speed coefficient based on volume of fuselage, $\frac{V}{\sqrt{\sigma \Omega^{1/3}}} = 0.211V$

$^{\rm C}V_{\triangle}$	speed coefficient based on load, $\frac{V}{\sqrt{g\left(\frac{\triangle}{W}\right)^{1/3}}} = \frac{c_{V_Q}}{\left(c_{\Delta_Q}\right)^{1/6}}$
$^{\mathrm{C}}_{\Delta_{\mathrm{Q}}}$	load coefficient based on volume of fuselage, $\frac{\Delta}{\text{wQ}} = 0.0467\Delta$
D	maximum diameter of fuselage, ft
g	acceleration of gravity, 32.15 ft/sec ²
h	height of center-line midpoint (as located on model with tail cone) above free-water surface, ft
L	length of model, ft
1	wetted length measured from aft end of the model to intersection of heavy-spray line with lower profile line, ft
M	trimming moment about center-line midpoint (as located on model with tail cone), lb-ft (14.9 $^{\rm C}{}_{\rm M_Q}$)
n	fineness ratio of fuselage, L/D
Q	volume of basic models, 0.338 cu ft
R	resistance, 1b
V	speed, ft/sec
W	density of water, 63.3 lb/cu ft
х	distance from center of pressure to aft end of fuselage, ft
Δ	load on water, 1b
ρ	mass density of water, 1.97 slugs/cu ft
Т	angle of trim of center line, deg

DESCRIPTION OF MODELS

The three models tested were streamline bodies of revolution of fineness ratios 6, 9, and 12. The nondimensional offsets presented in table I were identical for all models and are the same as those for the family of fuselages tested in reference 8. For all three models, the centroid of the volume was 0.46L from the nose, the volume Q was 0.338 cubic foot. For the offsets in table I the ratio of the volume of a model to the volume of the cylinder formed by its length and maximum diameter is 0.591 regardless of size or fineness ratio.

Pertinent dimensions and characteristics of the models are compared in figure 1. Narrow, full-length chine strips were located 45° from the lower profile line. In order to simulate a fuselage with jet exhaust, the aft ends were made removable aft of the station where the cross-sectional area of the fuselages were 0.073 square foot. The volume of these removable cones was 0.001, 0.002, and 0.003 cubic foot for fineness ratios 6, 9, and 12, respectively. Transverse lines, 1 inch apart, were painted on the underside of each model for measuring wetted length (fig. 2).

APPARATUS AND PROCEDURE

Tests were conducted with the small model towing gear of Langley tank no. 2 (fig. 3). A V-shaped wind screen, 3 feet wide with an included angle of 90° and extending to within less than an inch from the water surface, was placed directly in front of the model. High-speed runs made with the models just above the water surface showed that the screen reduced aerodynamic forces to a negligible value.

The models with chine strips were tested at fixed trims of 0° , 4° , 8° , 12° , 16° , and 20° at constant speeds and loads. The load-speed range for these tests is shown in figure 4. Tests were also made on the models with the chine strips removed but were restricted to low speeds because of excessive forces and spray. Additional tests were made on the models with chine strips but with the tail cones removed. These tests were limited to a trim of 8° and load coefficients of 0.2 and 0.4.

Measurements were made of resistance, trimming moment, wetted length, and height of the center-line midpoint above the free-water surface. Resistance was measured by a strain-gage dynamometer, which indicated the horizontal force on the towing staff. Trimming moment was measured by a strain-gage dynamometer, which indicated the moment about the midpoint of the center line of the model. In the case of the model with the tail cone removed, the center-line midpoint was the same distance from the

NACA RM L54K22 5

nose as that for the model of the same fineness ratio with the tail cone attached. Center of pressure, as calculated from the measured forces and moments, is the point where the resultant of the hydrodynamic forces intersected the center line.

Wetted length was determined from underwater photographs, as illustrated in figure 2. It was measured along the center line from the aft end of the model to the station at which the heavy-spray line intersected the lower profile line.

The measurements are believed to be accurate within the following limits:

Load, lb												±0.1
Resistance, lb												±0.1
Trimming moment, 1b-ft												
Wetted length, ft												
Height, ft												±0.01
Trim, deg · · · · ·												±0.1
Speed, fps · · · · ·		•	•									±0.2

RESULTS AND DISCUSSION

The data for the models of fineness ratios 6, 9, and 12, with chine strips, are given in tables II, III, and IV and are plotted in figures 5 and 6, 7 and 8, and 9 and 10, respectively. Spray photographs are shown in figure 11. The data for the models of fineness ratios 6, 9, and 12, without chine strips, are given in tables V, VI, and VII, and are plotted in figures 12, 13, and 14, respectively. Spray photographs are shown in figure 15. The data for the models of fineness ratios 6, 9, and 12, with chine strips, but with the tail cones removed, are given in tables VIII, IX, and X, and are plotted in figures 16, 17, and 18. Spray photographs are shown in figure 19.

Method of Data Presentation

The data in each table are presented in three groups. In the first four columns, the data are presented as hydrodynamic Froude scale coefficients. These coefficients are similar to conventional hydrodynamic Froude coefficients, except that the cube root of the total volume $Q^{1/3}$ is used as the characteristic linear dimension, rather than the beam. Since the volume is constant in this case, the use of $Q^{1/3}$ provides a direct comparison of the three fineness-ratio hulls.

NACA RM L54K22

In the next five columns the data are presented as hydrodynamic coefficients which, under low-speed displacement conditions, generally group along a single curve for all the speed-load combinations investigated. These coefficients and ratios are based on the cube root of the displaced volume $(\Delta/w)^{1/3}$ as the characteristic linear dimension because, under displacement conditions, buoyancy forces predominate.

In the last five columns the data are presented as hydrodynamic coefficients which, under high-speed planing conditions, generally group along a single curve for all the speed-load combinations investigated. These coefficients also are based on the characteristic linear dimension $\mathbb{Q}^{1/3}$ and are analogous to fundamental aerodynamic coefficients because, under planing conditions, dynamic forces predominate. The lengths, x, l, and h, are expressed as ratios of overall length L to facilitate comparisons. The value of L for the models without tail cones is, of course, less than the value of L for the corresponding models with tail cones.

These "collapsing" coefficients, which are generally independent of speed and load, were obtained by the methods of references 9, 10, and 11.

In order to facilitate analysis, the collapsing coefficients were used exclusively in plotting the data. The displacement coefficients were plotted against the Froude speed coefficient $C_{V_{\Delta}}$ and the planing coefficients against the dynamic lift coefficient C_{L_Q} . At a given trim, the planing range for each load tested was assumed to extend up to C_{L_Q} (or down to a speed) beyond which the C_{D_Q} data began to deviate from the single curve. At all lower speeds, displacement conditions should be applied. Since there is no well-defined boundary between displacement and planing, the ranges of $C_{V_{\Delta}}$ and C_{L_Q} are overlapped, particularly for the lower values of C_{Δ_Q} and T.

General Characteristics

At very low trims the streamline bodies with chine strips had an increasing tendency to suck under the water surface with increase in c_{V} . However, this tendency decreased with increase in fineness ratio or trim. At 0° trim (figs. 5(a), 7(a), and 9(a)) the models for all three fineness ratios sucked under and no data were obtained for planing conditions. At 4° trim the fineness-ratio-6 model (fig. 5(b)) sucked under but only for a short range of $c_{V_{\Lambda}}$.

Under displacement conditions (figs. 5, 7, and 9), the drag coefficients $C_{D_{\triangle}}$, for a given trim and fineness ratio, generally grouped along a single curve for all loads with a small and fairly uniform scatter. Center-of-pressure ratio $\frac{x}{(\triangle/w)^{1/3}}$ and wetted-length ratio $\frac{1}{(\triangle/w)^{1/3}}$

also grouped along a single curve for the heavier loads, with very little scatter, but, with decrease in trim or fineness ratio, individual curves were required for an increasing number of the lighter loads. The height ratios $\frac{h}{(\sqrt{h})^{1/3}}$ did not collapse at all.

With increase in speed coefficient $c_{V_{\Delta}}$, the drag coefficient $c_{D_{\Delta}}$ increased rapidly to a peak value at $c_{V_{\Delta}} \approx 1.2$. In a more conventional plot of the Froude scale coefficients, c_{R_Q} against c_{V_Q} , the resistance corresponding to the peak at $c_{V_{\Delta}}$ of about 1.2 would appear only as a slight protuberance on the upward slope of the curve. On the other hand, the resistance peak normally obtained in such a conventional plot appears on the plots of $c_{D_{\Delta}}$ against $c_{V_{\Delta}}$ only as a slight proturberance on the downward slope of that curve approximately at values of $c_{V_{\Delta}}$ where planing forces become predominant.

Under planing conditions (figs. 6, 8, and 10), the drag coefficients c_{D_Q} , as well as the ratios for center of pressure x/L, wetted length l/L, and height h/L, for a given trim and fineness ratio, all grouped along single curves for all loads.

The simultaneous side and bottom photographs of the models with chine strips (fig. 11) show that the spray became heavier with increase in speed until planing began; after which the amount of spray decreased.

Effect of Trim

The effect of trim on the hydrodynamic characteristics of the models with chine strips is shown in figures 20, 21, and 22 for fineness ratios 6, 9, and 12, respectively. Data for resistance, center of pressure, ratio of center of pressure to wetted length, wetted length, and height of the center-line midpoint are plotted against $C_{V_{\Delta}}$ and $C_{L_{Q}}$ for constant trims in parts (a), (b), (c), (d), and (e), respectively, of these figures. For trims at which more than one curve had to be drawn in figures 5 to 10, the curve for $C_{\Delta_{Q}} = 0.3$ was used in figures 20, 21, or 22 as being representative.

Resistance. For a given speed coefficient $C_{V_{\Delta}}$, the drag coefficient $C_{D_{\Delta}}$ generally increased with trim τ up to values of $C_{V_{\Delta}}$ varying from about 3.5 for fineness ratio 6 to about 4.0 for fineness ratio 12. The plots of the drag coefficient C_{D_Q} against the lift coefficient C_{L_Q} are approximately parallel curves for all trims. For a given C_{L_Q} , C_{D_Q} generally decreased with increase in trim up to a best trim (trim for minimum resistance). For fineness ratio 6, best trim appeared to be just above 20° . For fineness ratio 9, best trim was between 16° and 20° ; and for fineness ratio 12, between 12° and 16° .

Center of pressure.- For a given $C_{V_{\Delta}}$, the curves of the center-of-pressure ratio $\frac{x}{(\Delta/w)^{1/3}}$ show a slight rearward movement of the center of pressure with increase in trim. For a given C_{L_Q} , the curves of the center-of-pressure ratio x/L show that the center of pressure moved rearward rapidly with increase in trim. At low values of C_{L_Q} the variation in center of pressure with trim became considerable and at small trims, the center of pressure on the lower fineness-ratio models was calculated to be forward of the wetted portion of the model (figs. 20(c), 21(c), and 22(c)). Such calculated values indicate that negative pressures were acting near the rear portion of the wetted area.

Wetted length.- For a given $C_{V_{\Delta}}$, the wetted-length ratio $\frac{l}{(\Delta/w)^{1/3}}$ decreased with increase in trim. For a given C_{L_Q} , the wetted-length ratio l/L also decreased with increase in trim. At the low trims, l/L still had a substantial value as C_{L_Q} approached zero.

Height.- For a given $C_{V_{\triangle}}$, the height ratio $\frac{h}{(\triangle/w)^{1/3}}$ increased with trim. For a given $C_{L_{\mathbb{Q}}}$, the height ratio h/L also increased with trim. The curve for fineness ratio 6 at 4° trim shows how the model sucked under at a $C_{V_{\triangle}}$ of about 4.5, while at higher trims the model rose with increase in $C_{V_{\triangle}}$. The curve for fineness ratio 9 at 4° trim shows a tendency to suck down at a $C_{V_{\triangle}}$ of about 6.5.

Spray. The side photographs of the fineness-ratio-9 model in figure 23 show that an increase in trim resulted in considerable reduction in spray. This effect increased with decrease in fineness ratio.

Effect of Fineness Ratio

The effect of fineness ratio on the hydrodynamic characteristics of the streamline bodies with chine strips is shown in figure 24 for best trim and in figure 25 for the condition where the hydrodynamic trimming moment M about the midpoint of the center line was zero. For each of these conditions, separate comparisons are made in the displacement speed range and in the planing speed range. The curves of best trim in figure 24 indicate the trims at which approximately minimum resistance was obtained within the scope of the investigation.

Displacement speed range.- At best trim (fig. 24(a)) for a given speed coefficient $C_{V_{\triangle}}$, an increase in fineness ratio decreased the trim τ , decreased the drag coefficient $C_{D_{\triangle}}$, moved the center of pressure forward (the center-of-pressure ratio $\frac{x}{(\triangle/w)^{1/3}}$ increased), increased

the wetted-length ratio $\frac{l}{(\Delta/w)^{1/3}}$, and decreased the height ratio $\frac{h}{(\Delta/w)^{1/3}}$. Similar effects were obtained at zero trimming moment (fig. 25(a)).

Planing speed range. At best trim (fig. 24(b)), for a given lift coefficient C_{L_Q} , an increase in fineness ratio decreased the trim τ ; had little effect on the drag coefficient C_{D_Q} , the center-of-pressure ratio x/L, or the wetted-length ratio l/L; but decreased the ratio of the height of the center-line midpoint to the overall length h/L. Similar effects were obtained at zero trimming moment (fig. 25(b)).

Reference lines of constant Δ/R were superimposed on the C_{DQ} curves in figures 24(b) and 25(b). For all three fineness ratios, Δ/R was approximately 3.5 at high values of C_{LQ} for both the best trim and the zero-trimming-moment conditions. However, with decrease in C_{LQ} , Δ/R increased to approximately 5.0 at best trim but decreased to approximately 2.0 for zero trimming moment.

Spray. The side photographs in figure 26 show that at a trim of 80, an increase in fineness ratio from 6 to 9 resulted in an appreciable reduction in spray. The reduction in spray was less marked with further increase in fineness ratio from 9 to 12. The effects of fineness ratio on the spray characteristics were similar at other trims but decreased somewhat with increase in trim.

Effect of Chine Strips

The effect of the chine strips on the hydrodynamic characteristics of the models is shown in figures 12, 13, and 14 for fineness ratios 6, 9, and 12, respectively. Faired curves through the data for the models without chine strips are shown as solid lines, together with corresponding curves for the models with chine strips, shown as dashed lines. Because the data for the models without strips were obtained only for low speeds, plots are given for displacement conditions only.

At 0° trim, the hydrodynamic characteristics of all three fineness-ratio models were just as poor with strips as without strips. At trims of 4° and higher, the chine strips still had practically no effect up to moderate speeds corresponding to a $\text{C}_{\text{V}_{\Delta}}$ of about 2.7. However, there was a slight tendency for the strips to take effect at lower values of $\text{C}_{\text{V}_{\Delta}}$ with increase in trim or fineness ratio. With further increase in $\text{C}_{\text{V}_{\Delta}}$, the hydrodynamic characteristics of the models without chine strips deteriorated rapidly. The rapid increase in draft, coupled with the movement forward of the center of pressure of the models without chine strips, indicates the development of increasingly powerful suction forces. Thus, the chine strips effectively improved the hydrodynamic characteristics of the streamline bodies except at very low speeds.

The simultaneous side and bottom photographs in figure 15 show that without chine strips, the spray characteristics of the streamline bodies deteriorated rapidly with increase in speed and also, to a lesser degree, with decrease in fineness ratio.

Effect of Removing Tail Cones

The effect of removing the tail cones from the bodies with chine strips is shown in figures 16, 17, and 18 for fineness ratios 6, 9, and 12, respectively. Faired curves through the data for the models without tail cones are plotted as solid lines, together with corresponding curves for the models with tail cones, shown as dashed lines. The curves for the models without tail cones are practically the same as those for the models with tail cones; some of them being identical.

The simultaneous side and bottom photographs in figure 19 show that the spray characteristics of the models with the tail cones removed are approximately the same as those of the models with tail cones (fig. 11).

CONCLUSIONS

The data obtained in this investigation of the hydrodynamic forces and moments acting on a family of streamline bodies of three fineness ratios with chine strips indicate the following:

- l. Under displacement conditions, for a given speed coefficient ${\rm C}_{{\rm V}_{\Lambda}},$ the drag coefficient ${\rm C}_{{\rm D}_{\!\Delta}}$ increased with trim.
- 2. Under planing conditions, for a given lift coefficient C_{L_Q} , the drag coefficient C_{D_Q} decreased with increase in trim up to a best trim (trim for minimum resistance).
- 3. Best trim, as well as trim for zero trimming moment about centerline midpoint (M = 0), decreased with increase in fineness ratio from 6 to 12.
- 4. At best trim, or for zero trimming moment about the center-line midpoint, an increase in fineness ratio from 6 to 12 resulted in a decrease in the drag coefficient $C_{D_{\triangle}}$ under displacement conditions but had little effect on the drag coefficient $C_{D_{Q}}$ under planing conditions.
- 5. With decrease in lift coefficient ${\rm C_{L_Q}}$, the load-resistance ration increased from about 3.5 to about 5.0 at best trim and decreased from about 3.5 to about 2.0 at trim for zero trimming moment about the centerline midpoint.
- 6. An increase in fineness ratio resulted in an appreciable reduction in spray.
- 7. The chine strips effectively improved the hydrodynamic characteristics of the streamline bodies except at very low speeds.

8. Removal of the tail cones had a negligible effect on the hydrodynamic characteristics of the streamline bodies.

Langley Aeronautical Laboratory,
National Advisory Committee for Aeronautics,
Langley Field, Va., October 29, 1954.

REFERENCES

- 1. Dawson, John R., and Wadlin, Kenneth L.: Preliminary Tank Tests of NACA Hydro-Skis for High-Speed Airplanes. NACA RM L7IO4, 1947.
- 2. Ramsen, John A.: The Effect of Rear Chine Strips on the Take-Off Characteristics of a High-Speed Airplane Fitted With NACA Hydro-Skis. NACA RM L9BlOa, 1949.
- 3. Wadlin, Kenneth L., and Ramsen, John A.: Tank Spray Tests of a Jet-Powered Model Fitted With NACA Hydro-Skis. NACA RM L8B18, 1948.
- 4. Weinflash, Bernard: The Effect of Air Jets Simulating Chines or Multiple Steps on the Hydrodynamic Characteristics of a Streamline Fuselage. NACA RM L8J21, 1949.
- 5. Weinflash, Bernard, Christopher, Kenneth W., and Shuford, Charles L., Jr.: The Effect of Air-Jet and Strip Modifications on the Hydrodynamic Characteristics of the Streamline Fuselage of a Transonic Airplane. NACA RM L9D20, 1949.
- 6. Weinflash, Bernard, Shuford, Charles L., Jr., and Christopher, Kenneth W.: Hydrodynamic Force Characteristics of a Streamline Fuselage Modified by Either Breaker Strips or Rows of Jets Simulating Chines. NACA RM L9L2la, 1950.
- 7. Weinflash, Bernard, and Shuford, Charles L., Jr.: Investigation of the Hydrodynamic Stability and Resistance of Two Streamline Fuselages. NACA RM L52Bll, 1952.
- 8. McBride, Ellis E., and Fisher, Lloyd J.: Experimental Investigation of the Effect of Rear-Fuselage Shape on Ditching Behavior. NACA TN 2929, 1953.
- 9. Locke, F. W. S., Jr.: General Resistance Tests of Flying Boat Hull Models. NACA WR W-70, 1944. (Formerly AAR 4B19)
- 10. Perring, W. G. A.: Water Performance of Seaplanes. Tank Data To Determine Effect of Wind, Variation of Loading or a Change of Air Structure. R. & M. No. 1657, British A.R.C., 1934
- 11. Perring, W. G. A., and Johnston, L.: Hydrodynamic Forces and Moments on a Simple Planing Surface, and on a Flying Boat Hull. R. & M. No. 1646, British A.R.C., 1935.

TABLE I.- NONDIMENSIONAL OFFSETS

d/L	2y/D
(a)	(b)
0 .010 .021 .042 .062 .083 .125 .167 .208 .250 .333 .417 .500 .583 .667 .750 .833 .875 .917 .958 .979 1.000	0 .213 .289 .402 .483 .552 .663 .746 .813 .865 .943 .985 1.000 .970 .884 .734 .514 .393 .266 .135 .068

^aRatio of distance from nose

to total length of model.

bRatio of diameter to maximum diameter of model.

TABLE II

EXPERIMENTAL HYDRODYNAMIC DATA FOR A BODY OF REVOLUTION

OF FINENESS RATIO 6 WITH CHINE STRIPS

C _{∆Q}	c_{V_Q}	c_{R_Q}	c_{M_Q}	$c^{\Lambda^{\nabla}}$	$c_{D_{\Delta}}$	$\frac{\mathbf{x}}{\left(\frac{\triangle}{\mathbf{w}}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{\mathtt{w}}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$^{\mathrm{C}}_{\mathrm{LQ}}$	$^{\mathrm{C}}\mathrm{D}_{\mathrm{Q}}$	<u>x</u>	<u>l</u>	h L
						т	= 0 ⁰						
0 0 0 0 0 0 0 0 0	0 .63 1.06 1.48 2.11 2.53 3.17 3.59	0 0 .002 .005 .011 .019 .028 .160	0 0 0 0 .010 .025 .048 .194						0 0 0 0 0 0	0 .0036 .0046 .0049 .0059 .0056 .0249		0.432 -514 -755 .842	0.084 .081 .080 .072 .069 .067
.10 .10 .10 .10 .10 .10	0 .63 1.06 1.48 2.11 2.53 3.17 3.59	0 .002 .009 .016 .032 .053 .122 .263	.003 .012 .048 .060 .075 .099 .149 .229	0 .93 1.55 2.17 3.10 3.72 4.65 5.26	0.046 .075 .068 .067 .076 .113	4.64 4.82 5.62 5.87 6.18 6.71 7.79 9.55	6.88 7.73 8.68 9.19	0.45 .43 .40 .43 .40 .33 .18	.4988 .1797 .0917 .0449 .0312 .0200	.0100 .0162 .0147 .0144 .0165 .0244 .0409	0.506 .526 .613 .640 .674 .731 .849	.749 .842 .946 	.049 .047 .044 .047 .044 .036 .020
.20 .20 .20 .20 .20	0 .63 1.06 1.48 2.11 2.53 3.17	0 .004 .018 .031 .048 .079 .219	.025 .030 .096 .123 .124 .129	0 .83 1.38 1.93 2.76 3.31 4.14	.058 .094 .083 .063 .072 .128	3.85 3.91 4.44 4.69 4.69 4.74 5.30	6.26 7.30 7.30 7.30	.25 .24 .20 .20 .20 .16 18	.9975 .3594 .1833 .0899 .0624 .0399	.0200 .0323 .0284 .0216 .0246 .0437	.529 .536 .610 .644 .644 .650 .728	.859 1.000 1.000	.035 .033 .027 .028 .028 .022
.30 .30 .30 .30 .30	0 .63 1.06 1.48 2.11 2.53 3.17	0 .004 .026 .039 .063 .118 .242	.040 .043 .123 .161 .146 .134 .095	0 .77 1.29 1.80 2.58 3.09 3.87	.045 .104 .080 .063 .082 .108	3.37 3.39 3.79 3.99 3.90 3.84 3.65	6.34 6.38 6.38 6.38	.14 .11 .06 .06 .06 .02	1.4963 .5391 .2750 .1348 .0936	.0200 .0467 .0357 .0283 .0368 .0483	.529 .532 .596 .627 .613 .603	.996 1.000 1.000	.022 .017 .010 .010 .010 .003
.40 .40 .40 .40 .40	1.06	0 .006 .036 .056 .089	.055 .055 .143 .190 .152	0 .74 1.23 1.72 2.46 2.96	.055 .119 .094 .074	3.08 3.08 3.37 3.53 3.41 3.26	5.79 5.79 5.79	.07 .04 01 01 01	1.9950 .7188 .3666 .1797 .1248	.0299 .0647 .0513 .0400	.532 .532 .583 .610 .590 .563	1.000	.012 .007 001 001 002
.50 .50 .50 .50	.63 1.06 1.48 2.11	0 .007 .048 .074 .099 .162	.069 .056 .155 .194 .125 .085	0 .71 1.18 1.66 2.37 2.84	.056 .136 .108 .070	2.86 2.82 3.08 3.17 2.99 2.89	5.38 5.38 5.38	0 03 09 09 10 18	2.4938 .8985 .4583 .2246 .1560	.0349 .0863 .0678 .0445	•532 •526 •573 •590 •556 •539	1.000	0 006 017 017 019 034
				-		The state of	τ = 40						
0 0 0 0 0 0 0 0 0 0 0 0	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64 5.28	0 .001 .002 .004 .011 .014 .023 .029 .040 .048	0 0 .013 .031 .052 .067 .095						0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.0050 .0036 .0037 .0049 .0044 .0045 .0045	4.711 7.879 8.131 8.159 8.610 8.081	.693	0.087 .088 .085 .082 .078 .071 .070 .071

TABLE II.- Continued

$^{\mathrm{C}}\!\Delta_{\!\mathrm{Q}}$	c_{V_Q}	c_{R_Q}	$c_{\mathrm{M_Q}}$	$C_{V_{\triangle}}$	$c_{\mathrm{D}_{\!\!\!\! \Delta}}$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{\overline{w}}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$c_{ m L_Q}$	$c_{\mathrm{D_Q}}$	<u>×</u> L	<u>l</u>	<u>h</u> L
						τ = 4 ⁰	- Contin	ued					
0 0 0 0 0 0	6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72 14.77	0.082 .103 .142 .181 .226 .264 .317 .376 .431	0.212 .279 .344 .434 .524 .610 .734 .848 .982						0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.0041 .0038 .0040 .0040 .0041 .0039 .0040 .0040	9.227 9.625 8.691 8.617 8.364 8.321 8.341 8.139 8.226	0.671 .671 .671 .668 .673 .665 .657 .668	0.071 .070 .071 .070 .071 .071 .073 .073
.10 .10 .10 .10 .10 .10 .10	1.48 2.11 2.53 3.17 3.59 4.22	0 .002 .009 .014 .027 .041 .053 .054 .061	024 019 .011 .021 .055 .113 .181 .190 .206	0 .93 1.55 2.17 3.10 3.72 4.65 5.26 6.19 6.81	0.046 .075 .059 .056 .059 .049 .039 .032	4.05 4.17 4.82 5.01 5.72 6.95 8.34 8.50 8.87 8.99	7.44 7.65 5.72 7.76 7.16	0.45 .46 .48 .45 .42 .35 .36 .43 .47	.4988 .1797 .0917 .0449 .0312 .0200 .0155 .0112	.0100 .0162 .0128 .0121 .0128 .0106 .0084 .0069	.441 .455 .526 .546 .623 .758 .910 .927 .967	.811 .833 .839 .845 .780	.049 .050 .052 .049 .046 .038 .039 .047 .051
.10 .10	6.33 7.39 8.44	.079 .101 .127 .162 .195 .238 .278 .336 .390	.235 .297 .324 .423 .504 .590 .682 .806 .935	7.74 9.29 10.84 12.39 13.94 15.49 17.04 18.59 20.13 21.68	.026 .023 .022 .021 .020 .020 .019 .019	9.36 10.54 11.00 12.84 14.09 15.58 16.96 18.66 20.36 21.97	6.83 6.62 6.46 6.39 6.36 6.31 6.29 6.29 6.29 6.10	•53 •56 •58 •57 •58 •58 •59 •59	.0072 .0050 .0037 .0028 .0022 .0018 .0015 .0013 .0011	.0057 .0050 .0047 .0045 .0043 .0043 .0041 .0042 .0041	1.021 1.149 1.200 1.399 1.536 1.698 1.850 2.035 2.221 2.393	.744 .721 .704 .696 .693 .687 .685 .685	.058 .061 .061 .063 .062 .063 .063 .065 .065
.20 .20 .20 .20 .20 .20	.63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .002 .015 .026 .041 .060 .120 .187	045 035 .024 .049 .080 .115 .229 .379	0 .83 1.38 1.93 2.76 3.31 4.14 4.69	.029 .079 .070 .054 .055 .070 .085	3.24 3.34 3.83 4.05 4.32 4.62 5.52 6.68	6.44	.25 .23 .21 .20 .17 .10 01	.9975 .3594 .1833 .0898 .0624 .0399 .0311	.0100 .0270 .0238 .0184 .0187 .0240 .0291	.445 .458 .526 .556 .593 .634 .758 .917	.884	.035 .032 .029 .029 .028 .023 .014 001
.20 .20 .20 .20 .20 .20	6.33 7.39 8.44 9.50 10.55 11.61 12.66	.110 .129 .152 .186 .218 .254 .295 .353 .405	.383 .434 .474 .535 .610 .661 .765 .894	6.90 8.28 9.66 11.04 12.42 13.80 15.18 16.56 17.94	.023 .019 .016 .015 .014 .013 .013 .013	6.80 7.19 7.49 7.96 8.50 8.87 9.60 10.48 11.13	5.84 5.54 5.40 5.23 5.22 5.07 5.05 4.99	.32 .38 .40 .42 .43 .45 .45 .46	.0144 .0100 .0073 .0056 .0044 .0036 .0030 .0025	.0079 .0064 .0056 .0052 .0048 .0046 .0044 .0043	.933 .987 1.028 1.092 1.166 1.217 1.318 1.439 1.527	.802 .760 .741 .718 .716 .696 .693 .685	.045 .052 .055 .057 .059 .062 .063
.30 .30 .30 .30 .30 .30 .30	.63 1.06 1.48 0 2.11 0 2.53 0 3.17 0 3.59 0 4.22	.024 .033 .056 .079 .141 .233	055 039 .043 .074 .103 .123 .240 .402	0 .77 1.29 1.80 2.58 3.09 3.87 4.38	.056 .055	3.54 3.69 3.78 4.34	5.90 6.11 6.04 6.22	.14 .11 .08 .10 .10 .07 .01 16	1.4963 .5391 .2750 .1348 .0936 .0599 .0466	.0431 .0302 .0252 .0246 .0282 .0362	.532 .556 .580 .593 .681 .799	.926	.022 .017 .013 .016 .016 .012 .002 025

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TABLE II - Continued EXPERIMENTAL HYDRODYNAMIC DATA FOR A BODY OF REVOLUTION

c_{Δ_Q}	c_{V_Q}	c_{R_Q}	c_{M_Q}	$c^{\Lambda^{\nabla}}$	$c_{D_{\!$	$\frac{\mathbf{x}}{\left(\frac{\triangle}{\mathbf{w}}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\mathbf{c}_{\mathbf{L}_{\mathbf{Q}}}$	c_{D_Q}	X L	<u>l</u>	<u>h</u> L
							- Conclu						440
0.30 .30 .30 .30 .30 .30	5.28 6.33 7.39 8.44 9.50 10.55 11.61	0.162 .161 .182 .206 .244 .277 .310	0.598 .568 .608 .657 .724 .785 .848	6.45 7.74 9.02 10.31 11.60 12.89 14.18	0.026 .018 .015 .013 .012 .011	6.05 5.92 6.09 6.31 6.61 6.86 7.12	5.52 5.11 4.98 4.80 4.64 4.57 4.47	0.18 .29 .32 .35 .35 .37 .38	0.0216 .0150 .0110 .0084 .0067 .0054 .0044	0.0116 .0080 .0067 .0058 .0054 .0050 .0046	0.950 .930 .957 .991 1.038 1.078 1.119	0.867 .802 .783 .755 .730 .718 .702	0.02 .04 .05 .05 .05
.40 .40 .40 .40 .40 .40	0 1.06 1.48 2.11 2.53 3.17	0 .005 .031 .047 .071 .096	054 034 .066 .099 .133 .147 .275	0 .74 1.23 1.72 2.46 2.96 3.70	.046 .103 .079 .059 .055	2.71 2.77 3.10 3.22 3.33 3.37 3.78	5.56 5.74 5.68 5.79	.06 .03 0 .02 .02 01 09	1.9950 .7188 .3666 .1797 .1248	.0249 .0557 .0431 .0319 .0299	.468 .479 .536 .556 .576 .583 .654	.963 -993 .982 1	.01
.40 .40 .40 .40 .40 .40	3.59 4.22 4.64 5.28 6.33 7.39 8.44	.197	.264 .764	7.39 8.62 9.85	.018	5.40 5.40 5.46	4.92 4.61 4.46	.20 .27 .30	.0200 .0147 .0112	.0098	.933 .933 .944	.850 .797	.03
.50 .50 .50 .50 .50	0 1.06 1.48 2.11 2.53 3.17	0 .005 .045 .059 .089 .122 .192	042 019 .084 .115 .146 .161 .293	0 .71 1.18 1.66 2.37 2.84 3.55	.040 .128 .086 .063 .060	2.57 2.63 2.89 2.97 3.04 3.08 3.40	5.27 5.38 5.38 5.38	01 03 06 04 05 08 19	2.4938 .8985 .4583 .2246 .1560	.0249 .0809 .0541 .0400 .0381 .0383	.479 .489 .539 .553 .566 .573 .634	.982 1.000 1.000	00 00 00 00 01 03
						т	= 80						
000000000000000000000000000000000000000	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.64 5.28	0 0 .002 .004 .009 .012 .019 .026 .036 .042 .052	0 0 0 0 .005 .015 .031 .040 .055 .065						0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 .0036 .0037 .0040 .0037 .0038 .0040 .0040 .0039	.500 .500 1.407 2.714 3.327 3.125 3.104 3.131 3.118	.488 .519 .530 .533	0.09 .09 .09 .08 .08 .08
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72 14.77 15.83 16.88	.072 .095 .121 .155 .193 .231 .275 .322 .374 .439	.125 .169 .203 .275 .324 .402 .469 .544 .610						000000000000000000000000000000000000000	.0036 .0035 .0034 .0035 .0034 .0034 .0034 .0034 .0035	3.455 3.522 3.347 3.508 3.347 3.448 3.394 3.367 3.266 3.121	.522 .528 .533 .528 .553 .525 .528 .547 .519	80. 80. 80. 80. 80. 80. 80.

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^C ∆Q	$^{\mathrm{C}}_{V_{\mathbb{Q}}}$	$^{\mathrm{C}_{\mathrm{R}}}_{\mathrm{Q}}$	$^{\mathrm{C}_{\mathrm{M}_{\mathrm{Q}}}}$	$c_{V_{\!$	$^{\mathrm{c}}\mathrm{D}_{\!\Delta}$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\stackrel{\triangle}{\underline{+}} \right)^{1/3}}$	$\frac{\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	c_{L_Q}	c_{D_Q}	T x	$\frac{l}{L}$	<u>h</u>
						τ = 8 ⁰							
0.10 .10 .10 .10 .10 .10 .10 .10 .10	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64 5.28	0 .002 .009 .016 .026 .032 .039 .046 .054 .061	-0.068 060 032 019 .031 .062 .080 .085 .096 .103	0 •93 1.55 2.17 3.10 3.72 4.65 5.26 6.19 6.81 7.74	0.046 .075 .068 .054 .046 .036 .033 .028 .026	3.09 3.89 4.17 5.22 5.84 6.24 6.52 6.64 6.83	6.31 6.44 6.03 6.05 5.64	0.51 .49 .51 .51 .53 .57 .63	0.4988 .1797 .0917 .0449 .0312 .0200 .0155 .0112 .0093	0.0100 .0162 .0147 .0117 .0100 .0078 .0072 .0061 .0057	0.337 .357 .425 .455 .570 .637 .681 .687 .711 .725	.702 .657 .660 .614	0.056 .054 .055 .056 .056 .058 .062 .066 .069
.10 .10 .10 .10 .10 .10 .10	6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72 14.77 15.83	.092 .114 .142 .166 .209 .244 .291 .338 .392 .458	.156 .184 .224 .289 .335 .415 .475 .555 .610	9.29 10.84 12.39 13.94 15.49 17.04 18.59 20.13 21.68 23.23	.021 .019 .019 .017 .018 .017 .017 .017	7.57 8.00 8.65 9.70 10.20 11.31 11.86 12.73 13.07 13.69	5.15 5.12 5.12 5.07 5.07 4.92 4.82 5.02 4.89 4.82	.67 .70 .70 .70 .71 .71 .71 .71	.0050 .0037 .0028 .0022 .0018 .0015 .0013 .0011 .0009	.0046 .0042 .0040 .0037 .0038 .0036 .0036 .0036 .0036	.826 .873 .944 1.058 1.112 1.233 1.294 1.388 1.426 1.492	.561 .558 .558 .553 .553 .536 .525 .547 .533 .525	.073 .076 .076 .076 .077 .077 .077 .077
.20 .20 .20 .20 .20 .20 .20 .20	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64	0 .003 .019 .025 .042 .062 .072 .075 .080	110 094 044 025 .040 .129 .202 .194 .194 .184	0 .83 1.38 1.93 2.76 3.31 4.14 4.69 5.52 6.07	.044 .100 .067 .055 .056 .042 .034 .026	2.67 2.83 3.26 3.41 3.98 4.69 5.30 5.23 5.13	5.66 5.87 5.83 4.97	.28 .24 .26 .23 .20 .26 .34 .39 .42	-9975 -3594 -1833 -0898 -0624 -0399 -0311 -0225 -0186	.0150 .0341 .0229 .0189 .0193 .0144 .0117 .0090 .0080	.367 .388 .448 .468 .546 .644 .727 .718 .718	.805 -800 -800 -682	.038 .033 .033 .036 .032 .028 .035 .046 .053
.20 .20 .20 .20 .20 .20 .20	5.28 6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72	.094 .114 .134 .162 .187 .228 .268 .307 .355	.184 .203 .235 .260 .324 .363 .433 .494	6.90 8.28 9.66 11.04 12.42 13.80 15.18 16.56 17.94	.020 .017 .014 .013 .012 .012 .012	5.13 5.25 5.48 5.65 6.11 6.33 6.78 7.15 7.44	4.54 4.40 4.23 4.19 4.13 4.09 4.05 3.93	. 46 . 50 . 52 . 54 . 54 . 55 . 55 . 56	.0144 .0100 .0073 .0056 .0044 .0036 .0030 .0025	.0068 .0057 .0049 .0045 .0041 .0040 .0038	.704 .721 .752 .775 .839 .869 .930 .981	.623 .603 .581 .575 .567 .561 .556	.063 .069 .072 .074 .074 .076 .076
.30 .30 .30 .30 .30 .30 .30 .30	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .005 .028 .036 .056 .088 .123 .116 .115	134 108 044 015 .050 .169 .249 .354 .333	0 .77 1.29 1.80 2.58 3.09 3.87 4.38 5.16	.056 .112 .074 .056 .061 .055 .040	2.51 2.59 2.96 3.11 3.41 3.99 4.35 4.87 4.72	5.29 5.52 5.45 5.45 4.73	.14 .11 .11 .14 .13 .08 .10 .17 .28	1.4963 .5391 .2750 .1348 .0936 .0599 .0466	.0249 .0503 .0330 .0252 .0275 .0246 .0180	.394 .414 .465 .489 .536 .627 .684 .765	.831 .867 .856 .856	.023 .017 .017 .023 .020 .013 .016 .027
.30 .30 .30 .30 .30 .30 .30	4.64 5.28 6.33 7.39 8.44 9.50 10.55 11.61	.116 .122 .140 .160 .184 .208 .245 .284	.303 .283 .289 .295 .315 .363 .394 .464	5.67 6.45 7.74 9.02 10.31 11.60 12.89 14.18	.024 .020 .016 .013 .012 .010 .010	4.62 4.53 4.54 4.54 4.63 4.85 4.95 5.23	4.29 4.00 3.88 3.70 3.61 3.57 3.57	.31 .36 .42 .45 .46 .47 .48	.0278 .0216 .0150 .0110 .0084 .0067 .0054 .0014	.0108 .0088 .0070 .0059 .0052 .0046 .0044	.725 .711 .714 .714 .728 .762 .778 .822	.673 .629 .609 .581 .567 .561	.048 .057 .066 .071 .072 .074 .075

TABLE II - Continued

c_{Δ_Q}	c_{V_Q}	c_{R_Q}	c_{M_Q}	$c_{V_{\triangle}}$	$c_{D_{\!$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{\overline{w}}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{\overline{w}}\right)^{1/3}}$	c_{L_Q}	c_{D_Q}	X L	½ L	h L
						-	- Conclu						
0.40 .40 .40 .40 .40 .40	0 .63 1.06 1.48 2.11 2.53 3.17	0 .006 .038 .048 .071 .102	-0.141 110 032 019 .070 .194 .465	0 .74 1.23 1.72 2.46 2.96 3.70	0.055 .126 .081 .059 .059	2.40 2.51 2.77 2.83 3.12 3.53 4.38	5.11 5.31 5.21 5.37	0.05 .04 .04 .05 .04 01	1.9950 .7188 .3666 .1797 .1248	0.0299 .0683 .0440 .0319 .0318	0.415 .435 .479 .489 .539 .610 .758	0.884 .918 .901 	0.009 .008 .007 .009 .008
.40 .40 .40 .40 .40	3.59 4.22 4.64 5.28 6.33 7.39 8.44	.181 .159 .153 .154 .167 .183	•533 •500 •461 •409 •394 •375 •375	4.19 4.93 5.42 6.16 7.39 8.62 9.85	.052 .033 .026 .020 .015 .012	4.60 4.50 4.38 4.21 4.17 4.09 4.07	4.74 4.15 3.86 3.65 3.52	.04 .33 .23 .29 .35 .39	.0622 .0449 .0371 .0288 .0200 .0147 .0112	.0281 .0179 .0142 .0111 .0083 .0067 .0058	.795 .778 .758 .728 .721 .708 .704	.819 .718 .668 .631 .609	.006 .057 .040 .050 .068
.50 .50 .50	0 .63 1.06 1.48 2.11	0 .007 .049 .063 .088	.127 086 013 .011	0 .71 1.18 1.66 2.37	.055 .140 .092 .063	2.35 2.46 2.64 2.72 2.89	4.93 5.12 5.08	03 05 05 02 04	2.4938 .8985 .4583 .2246	.0349 .0881 .0577 .0395	.438 .458 .492 .506	.918 .954 	00 01 00 00
.50 .50 .50	2.53 3.17 3.59 4.22	.125 .209 .291 .216	.224 .504 .703 .703	2.84 3.55 4.03 4.74	.062 .066 .072 .039	3.22 3.89 4.34 4.36	5.26	09 16 18 .05	.1560 .0999 .0777 .0562	.0390 .0417 .0452 .0243	.600 .725 .809 .812	.979	01 02 03 .00
						т	= 12°						
0 0 0 0 0 0 0	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.64 5.28	0 0 .001 .003 .006 .007 .012 .016 .021 .022	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0						0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 .0018 .0027 .0027 .0022 .0024 .0025 .0024 .0020	0.500 .500 .500 .500 .500 .737 .855 .842 .889	.393 .356 .373 .393 .399 .401	.110 .100 .100 .100 .100 .100 .100 .100
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72 14.77 15.83 16.88	.045 .006 .076 .093 .115 .141 .169 .201 .235 .270	.020 .027 .034 .046 .055 .066 .099 .089 .114 .124						0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	.0022 .0022 .0021 .0021 .0021 .0021 .0021 .0022 .0022	1.010 1.030 1.010 1.057 1.044 1.030 1.165 1.003 1.050 1.024 1.236	.404 .396 .407 .407 .407 .399 .381 .404 .384 .404	.10 .10 .10 .10 .10 .10 .10 .10
.10 .10 .10 .10 .10 .10 .10	.63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .003 .010 .018 .026 .030 .036 .041 .047	080 075 055 039 0 .004 .011 .011	0 .93 1.55 2.17 3.10 3.72 4.65 5.26 6.19 6.81	0.070 .084 .077 .054 .044 .033 .030 .025	2.81 2.94 3.40 3.74 4.57 4.67 4.82 4.79 4.67	5.51 5.59 5.46 4.95 4.56	0.62 .59 .61 .62 .62 .64 .69 .76 .79	.4988 .1797 .0197 .0449 .0312 .0200 .0155 .0112 .0093	.0150 .0180 .0165 .0117 .0094 .0072 .0064 .0053 .0045	.307 .320 .371 .408 .500 .509 .526 .522 .522	.601 .609 .595 .539	.066 .066 .066 .066 .077 .070 .080 .080

TABLE II - Continued

EXPERIMENTAL HYDRODYNAMIC DATA FOR A BODY OF REVOLUTION

OF FINENESS RATIO 6 WITH CHINE STRIPS

c_{Δ_Q}	$^{\mathrm{C}}\mathrm{V}_{\mathrm{Q}}$	c_{R_Q}	c_{M_Q}	$c^{\Lambda^{\nabla}}$	$^{\mathrm{C}}\mathrm{D}_{\!$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{h}{\left(\stackrel{\triangle}{w}\right)^{1/3}}$	$\mathrm{c}_{\mathrm{L}_{\mathrm{Q}}}$	c_{D_Q}	T	<u>l</u>	<u>h</u> L
							- Contin						
0.10 .10 .10 .10 .10 .10 .10 .10 .10	5.28 6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72 14.77 15.83	0.056 .069 .086 .102 .121 .142 .169 .196 .228 .263	0.007 .012 .016 .032 .035 .046 .055 .085 .085	7.74 9.29 10.84 12.39 13.94 15.49 17.04 18.59 20.13 21.68 23.23	0.019 .016 .015 .013 .012 .012 .011 .011	4.70 4.82 4.88 5.16 5.19 5.35 5.47 5.87 6.02	4.33 4.09 3.97 3.97 3.27 3.89 3.63 3.76 3.68 3.71	0.84 .86 .88 .90 .90 .90 .90 .90	0.0072 .0050 .0037 .0028 .0022 .0018 .0015 .0013 .0011 .0009	0.0040 .0034 .0032 .0029 .0027 .0026 .0025 .0024 .0024 .0024	0.512 .526 .532 .563 .566 .583 .596 .640 .640	0.472 .446 .432 .432 .432 .356 .424 .396 .410 .401	0.092 .094 .096 .098 .098 .098 .098 .098 .098
.20 .20 .20 .20 .20 .20 .20 .20 .20	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64	0 .005 .021 .027 .049 .056 .063 .069 .073	135 120 084 065 .030 .065 .069 .062 .050	0 .83 1.38 1.93 2.76 3.31 4.14 4.69 5.52 6.07	.073 .110 .072 .064 .051 .037 .031 .024	2.46 2.58 2.92 3.07 3.88 4.17 4.20 4.15 4.03 3.91	5.03 5.19 5.17 4.60	.31 .27 .28 .31 .28 .32 .41 .46 .51	.9975 .3594 .1833 .0898 .0624 .0399 .0311 .0225 .0186	.0249 .0377 .0247 .0220 .0175 .0126 .0107 .0082	.337 .354 .401 .421 .532 .573 .576 .570 .553	.690 -713 -710 -631 -567	.043 .037 .039 .043 .038 .044 .056 .063 .070
.20 .20 .20 .20 .20 .20 .20	5.28 6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72	.083 .096 .112 .130 .148 .169 .194 .223	.025 .022 .020 .025 .035 .036 .045 .072	6.90 8.28 9.66 11.04 12.42 13.80 15.18 16.56 17.94	.018 .014 .012 .011 .010 .009 .008 .008	3.83 3.80 3.78 3.83 3.91 3.91 3.96 4.15 4.10	3.76 3.56 3.37 3.23 3.25 3.21 3.05 3.07 3.17	.60 .62 .64 .65 .66 .67 .68 .68	.0144 .0100 .0073 .0056 .0044 .0036 .0030 .0025	.0060 .0048 .0041 .0037 .0033 .0030 .0029 .0028	.526 .522 .519 .526 .536 .536 .543 .570	.516 .488 .463 .443 .446 .441 .418 .421 .435	.082 .085 .088 .089 .091 .092 .094
.30 .30 .30 .30 .30 .30 .30 .30	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .006 .032 .040 .067 .085 .099 .101 .105	168 145 101 075 .045 .139 .174 .154	0 .77 1.29 1.80 2.58 3.09 3.87 4.38 5.16	.067 .128 .082 .067 .059 .044 .035	2.32 2.44 2.68 2.81 3.39 3.84 4.01 3.90 3.73	4.82 5.00 4.54 3.89	.17 .14 .16 .18 .13 .15 .26 .34	1.4963 .5391 .2750 .1348 .0936 .0599 .0466	.0299 .0575 .0367 .0301 .0265 .0198 .0157	.364 .384 .421 .441 .532 .603 .630 .613	.758 .780 .786 .713	.027 .022 .025 .028 .021 .024 .042 .054
.30 .30 .30 .30 .30 .30 .30	5.28 6.33 7.39 8.44 9.50 10.55	.197		5.67 6.45 7.74 9.02 10.31 11.60 12.89 14.18	.018 .014 .011 .010 .009	3.60 3.49 3.41 3.37 3.32 3.32 3.32 3.35	3.54 3.27 3.12 3.02 2.97 2.91 2.80	.45 .50 .53 .56 .57 .57	.0278 .0216 .0150 .0110 .0084 .0067 .0054	.0100 .0082 .0062 .0051 .0045 .0039 .0035	.566 .549 .536 .529 .522 .522 .522	.457 .441	.071 .078 .083 .088 .090 .090
.40 .40 .40 .40 .40	.63 1.06 1.48 2.11 2.53	.046 .054 .083	089 067 .068 .224	.74 1.23 1.72 2.46 2.96	.152 .091 .069	2.26 2.36 2.57 2.65 3.12 3.63 3.86	4.69 4.82 4.85 	.05 .04 .04 .08 .02 .02	1.9950 .7188 .3666 .1797 .1248	.0827 .0495 .0373 .0374		.833	.009 .006 .007 .013 .004 .003

TABLE II - Continued EXPERIMENTAL HYDRODYNAMIC DATA FOR A BODY OF REVOLUTION

C _{∆Q}	$^{\text{C}}V_{\mathbb{Q}}$	c_{R_Q}	c_{M_Q}	$c_{V_{\triangle}}$	$c_{D_{\!$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$^{\mathrm{C}}_{\mathrm{L}_{\mathrm{Q}}}$	c_{D_Q}	X L	l L	<u>h</u> L
			-			τ = 12	o - Conc						
0.40 .40 .40 .40 .40 .40 .40	3.59 4.22 4.64 5.28 6.33 7.39 8.44	0.141 .140 .142 .146 .155 .169 .183	0.277 .224 .174 .135 .089 .060	4.19 4.93 5.42 6.16 7.39 8.62 9.85	0.040 .029 .024 .019 .014 .011	3.78 3.60 3.45 3.31 3.17 3.08 3.06	3.79 3.40 3.10 2.95 2.84	0.21 .30 .36 .40 .46 .48	0.0622 .0449 .0371 .0288 .0200 .0147 .0112	0.0219 .0157 .0132 .0105 .0077 .0062 .0051	0.654 .623 .596 .573 .549 .532 .529	.589 .536 .511 .491	0.036 .053 .063 .070 .079 .084
.50 .50 .50 .50 .50 .50 .50	0 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .010 .059 .067 .103 .148 .179 .179	169 134 087 047 .095 .322 .441 .427 .354	0 .71 1.18 1.66 2.37 2.84 3.55 4.03 4.74	.079 .168 .097 .073 .073 .057 .044	2.24 2.34 2.46 2.55 2.92 3.46 3.73 3.71 3.53	4.62 4.73 4.76 4.53 3.83	04 06 05 .01 05 10 01 .09	2.4938 .8985 .4583 .2246 .1560 .0999 .0777	.0499 .1060 .0614 .0463 .0462 .0357 .0278	.417 .435 .458 .475 .543 .644 .694 .691	.861 881 887 844 713	00° 012 009 009 019 001 .038
			-			7	= 16°						
0 0 0 0 0	0 .63 1.06 1.48 2.11 4.64 11.61	0 0 0 0 0 0	0 0 0 0 0						0 0 0 0 0 0 0 0 0	0 0 0 0 0 0		.216	0.13 .13 .14 .14 .14 .15
.10 .10 .10 .10 .10 .10 .10 .10	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64 5.28	0 .006 .013 .020 .026 .028 .029 .028 .029 .031	094 089 079 060 046 049 058 069 079 085 094	0 .93 1.55 2.17 3.10 3.72 4.65 5.26 6.19 6.81 7.74	0.139 .109 .085 .054 .040 .027 .020 .015 .013	2.47 2.60 2.87 3.31 3.62 3.55 3.37 3.15 2.94 2.81 2.63	4.82 4.92 4.51 3.86 3.35 3.04	0.72 .68 .72 .73 .81 .85 .94 .98 1.04 1.07	0.4988 .1797 .0917 .0449 .0312 .0200 .0155 .0112 .0093	0.0299 .0234 .0183 .0117 .0087 .0058 .0044 .0033 .0029	0.270 .283 .313 .361 .394 .388 .367 .344 .320 .320	.525 .536 .491 .421 .365	.07 .07 .07 .08 .08 .09 .10 .10 .11
.10 .10 .10 .10 .10 .10 .10 .10	6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72 14.77 15.83	.029 .031 .031 .033 .033 .032 .031 .032	115 143 159 180 165 194 201 209 230 209	9.29 10.84 12.39 13.94 15.49 17.04 18.59 20.13 21.68 23.23	.006 .005 .004 .003 .003 .002 .002 .001 .001	2.19 1.61 1.30 .87 1.21 .59 .43 .28 15	2.63 2.50 2.40 2.24 2.14 1.80 1.73 1.47 .31	1.11 1.13 1.15 1.16 1.17 1.19 1.20 1.20 1.19	.0050 .0037 .0028 .0022 .0018 .0015 .0013 .0011 .0009	.0014 .0011 .0009 .0007 .0006 .0005 .0004 .0003 .0003	.239 .175 .142 .094 .131 .064 .047 .030 170	.286 .272 .261 .244 .233 .196 .188 .160 .034 .123	.12 .12 .12 .12 .12 .12 .13 .13
.20 .20 .20 .20 .20 .20 .20	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .006 .026 .037 .054 .057 .060 .060	155 147 127 087 032 030 049 067 090	0 .83 1.38 1.93 2.76 3.31 4.14 4.69 5.52	.087 .137 .099 .071 .052 .035 .027	2.26 2.33 2.52 2.90 3.37 3.39 3.24 3.10 2.90	4.50 4.68 4.46 3.68 3.19	.37 .34 .38 .38 .41 .50 .61 .66	.9975 .3594 .1833 .0898 .0624 .0399 .0311 .0225	.0299 .0467 .0339 .0243 .0178 .0120 .0093 .0066	.310 .320 .347 .398 .462 .465 .445 .425	.617 .643 .612 .505	.05 .04 .05 .05 .05 .06 .08

TABLE II - Continued

EXPERIMENTAL HYDRODYNAMIC DATA FOR A BODY OF REVOLUTION

OF FINENESS RATIO 6 WITH CHINE STRIPS

c_{Δ_Q}	c_{V_Q}	c_{R_Q}	c_{M_Q}	$C_{\overline{V}^{\triangle}}$	$c_{D_{\!$	$\frac{x}{\left(\stackrel{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	c_{L_Q}	c_{D_Q}	$\frac{\Gamma}{\overline{x}}$	<u>l</u>	$\frac{h}{L}$
						т = 16 ⁰	- Conclu	ided					
0.20 .20 .20 .20 .20 .20 .20 .20	4.64 5.28 6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72	0.059 .059 .059 .061 .060 .062 .066 .071 .073	-0.105 130 161 200 230 260 270 308 337 351	6.07 6.90 8.28 9.66 11.04 12.42 13.80 15.18 16.56 17.94	0.016 .012 .008 .006 .005 .004 .004 .003 .003	2.78 2.58 2.31 1.99 1.74 1.50 1.42 1.13 .91	2.80 2.60 2.45 2.25 2.13 2.15 1.98 1.74	0.76 .78 .82 .83 .87 .88 .88 .89	0.0186 .0144 .0100 .0073 .0056 .0044 .0036 .0030 .0025	0.0055 .0042 .0029 .0022 .0017 .0014 .0012 .0011 .0009	0.381 .354 .317 .273 .239 .206 .195 .155 .125	0.384 .356 .337 .309 .292 .295 .272 .238	0.105 .107 .113 .114 .119 .120 .120 .123 .124
.30 .30 .30 .30 .30 .30 .30 .30	0 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .010 .042 .054 .089 .095 .098 .096	190 174 151 101 0 .015 0 030 069	0 .77 1.29 1.80 2.58 3.09 3.87 4.38 5.16	.111 .168 .110 .089 .066 .044 .033	2.19 2.27 2.43 2.68 3.18 3.24 3.18 3.02 2.85	4.39 4.50 4.41 3.70 3.12	.19 .17 .20 .21 .23 .25 .44 .51	1.4963 .5391 .2750 .1348 .0936 .0599 .0466	.0499 .0755 .0495 .0400 .0296 .0196 .0149	.344 .357 .381 .421 .500 .509 .499 .475 .448	.690 707 693 581 491	.029 .027 .031 .033 .036 .039 .069 .080
.30 .30 .30 .30 .30 .30	4.64 5.28 6.33 7.39 8.44 9.50 10.55 11.61	.092 .089 .088 .090 .092 .093 .095	100 132 190 230 255 310 330	5.67 6.45 7.74 9.02 10.31 11.60 12.89 14.18	.019 .014 .010 .007 .006 .005 .004	2.71 2.55 2.27 2.08 1.95 1.69 1.61 1.39	2.79 2.50 2.34 2.16 2.02 2.04 1.91	.61 .65 .69 .72 .74 .75 .76	.0278 .0216 .0150 .0110 .0084 .0067 .0054	.0085 .0064 .0044 .0033 .0026 .0021 .0017	.425 .401 .357 .327 .307 .266 .253	.438 .393 .368 .340 .317 .320	.096 .103 .108 .113 .117 .119 .120
.40 .40 .40 .40 .40 .40	0 .63 1.06 1.48 2.11 2.53 3.17	0 .012 .057 .071 .120 .134 .139	204 188 167 096 .043 .089	0 .74 1.23 1.72 2.46 2.96 3.70	.110 .189 .120 .099 .077	2.16 2.22 2.32 2.55 3.02 3.17 3.12	4.33 4.41 4.35 3.75	.05 .02 .05 .06 .06 .14	1.9950 .7188 .3666 .1797 .1248	.0599 .1024 .0651 .0539 .0418 .0278	.374 .384 .401 .441 .522 .549	.749 .763 .752 	.008 .003 .008 .011 .011 .024 .048
.40 .40 .40 .40 .40 .40	3.59 4.22 4.64 5.28 6.33 7.39 8.44	.137 .132 .132 .128 .121 .121	.025 029 069 120 193 250 281	4.19 4.93 5.42 6.16 7.39 8.62 9.85	.039 .027 .023 .017 .011 .008	2.96 2.79 2.67 2.49 2.26 2.06 1.97	3.13 2.71 2.43 2.26 2.16	.36 .44 .50 .54 .59 .61	.0622 .0449 .0371 .0288 .0200 .0147 .0112	.0213 .0148 .0123 .0092 .0060 .0044 .0034	.512 .482 .462 .431 .391 .357 .340	.542 .469 .421 .390 .373	.062 .077 .086 .093 .102 .106
•50 •50 •50 •50 •50 •50 •50 •50	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .015 .073 .085 .149 .167 .179 .176	205 179 155 084 .070 .163 .170 .104	0 .71 1.18 1.66 2.37 2.84 3.55 4.03 4.74	.119 .208 .124 .106 .083 .057 .043	2.14 2.21 2.28 2.46 2.84 3.08 3.08 2.93 2.73	4.29 4.40 4.34 3.69 3.09	05 08 05 02 04 .02 .19 .27	2.4938 .8985 .4583 .2246 .1560 .0999 .0777 .0562	.0748 .1312 .0779 .0669 .0521 .0357 .0274	.398 .411 .425 .458 .529 .573 .573 .546 .509	.800 .819 .808 .687	010 016 009 004 008 .004 .035 .051 .069

TABLE II - Continued

EXPERIMENTAL HYDRODYNAMIC DATA FOR A BODY OF REVOLUTION

C∆Q	C _{VQ}	c_{R_Q}	c_{M_Q}	$c_{V_{\Delta}}$	c _D ∆	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{\mathbf{w}}\right)^{1/3}}$	$\frac{h}{\left(\frac{\Delta}{W}\right)^{1/3}}$	c_{L_Q}	c_{D_Q}	X L	l L	h L
EFF.						т	= 20 ⁰						
0 0 0 0 0 0 0 0	0 .63 1.06 1.48 2.11 2.53 3.17	0 0 0 0 0 0	0 0 0 0 0 0						0 0 0 0 0 0 0 0 0	0 0 0 0 0		0.233 .123 .084 	0.172 .176 .178 .185 .188 .188
0 0 0 0 0	3.59 4.22 4.64 5.28 6.33 12.66	0 0 0 0 0 0	0 0 0 0 0 0						0 0 0 0	0 0 0 0 0 0		0 0 0	.323 .188 .188 .188 .188
.10 .10 .10 .10 .10 .10 .10 .10	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64 5.28	0 .008 .016 .025 .027 .024 .024 .023 .021 .019	095 090 086 069 080 101 110 125 139 151	0 .93 1.55 2.17 3.10 3.72 4.65 5.26 6.19 6.81 7.74	0.185 .134 .106 .056 .035 .022 .017 .011 .008	2.38 2.53 2.72 3.12 3.12 2.87 2.44 2.26 1.92 1.58	4.45 4.48 3.79 	0.85 .80 .87 .90 1.04 1.13 1.21 1.26 1.33 1.36	0.4988 .1797 .0917 .0449 .0312 .0200 .0155 .0112 .0093 .0078	0.0399 .0288 .0229 .0121 .0075 .0048 .0036 .0024 .0018	0.259 .279 .297 .340 .313 .266 .246 .209 .172 .145	.485 488 413 323 250 196	.092 .087 .095 .098 .114 .123 .132 .138 .145 .148
.10 .10 .10 .10 .10 .10 .10 .10	6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72 14.77 15.83	.016 .016 .016 .018 .018 .018 .018 .018	170 180 190 194 210 204 214 209 225	9.29 10.84 12.39 13.94 15.49 17.04 18.59 20.13 21.68 23.23	.004 .003 .002 .002 .001 .001 .001	.90 .68 .46 .37 .06 .19 06 .06	1.39 1.11 .85 .88 .75 .62 .67 .18 .44	1.42 1.46 1.46 1.48 1.49 1.50 1.50 1.50	.0050 .0037 .0028 .0022 .0018 .0015 .0013 .0011 .0009	.0008 .0006 .0004 .0003 .0003 .0002 .0002 .0002	.098 .074 .051 .040 .007 .020 007 .007	.152 .121 .093 .096 .081 .067 .073 .020 .048	.155 .159 .159 .161 .162 .163 .163
.20 .20 .20 .20 .20 .20 .20 .20 .20	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64	0 .012 .034 .052 .059 .060 .056 .053 .047	165 153 141 102 080 094 130 159 194 214	0 .83 1.38 1.93 2.76 3.31 4.14 4.69 5.52 6.07	.175 .179 .139 .077 .055 .033 .024 .015	2.11 2.26 2.43 2.78 2.97 2.87 2.55 2.31 2.01 1.84	4.17 3.80 3.01 2.45	.43 .42 .47 .49 .61 .70 .81 .89	-9975 3594 1833 0898 0624 0399 0311 0225 0186	.0599 .0611 .0477 .0265 .0187 .0112 .0082 .0053 .0043	.290 .310 .334 .381 .407 .394 .350 .317 .276	.572 -587 -522 -413 -337	.060 .057 .064 .067 .084 .096 .112 .122 .130
.20 .20 .20 .20 .20 .20 .20 .20	5.28 6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72	.043 .036 .033 .035 .034 .035 .034 .033	241 276 307 320 352 350 381 391 401	6.90 8.28 9.66 11.04 12.42 13.80 15.18 16.56 17.94	.009 .005 .004 .003 .002 .002 .001 .001	1.60 1.28 1.01 .88 .61 .63 .37 .27 .20	2.05 1.64 1.44 1.15 1.11 1.06 .75 .65	1.01 1.05 1.08 1.10 1.14 1.15 1.15	.0144 .0100 .0073 .0056 .0044 .0036 .0030 .0025	.0031 .0018 .0012 .0010 .0008 .0006 .0005 .0004	.219 .175 .138 .121 .084 .087 .051 .037	.281 .225 .197 .157 .153 .146 .103 .089	.139 .145 .149 .152 .156 .156 .157

TABLE II - Concluded

EXPERIMENTAL HYDRODYNAMIC DATA FOR A BODY OF REVOLUTION

OF FINENESS RATIO 6 WITH CHINE STRIPS

$^{\mathrm{C}}\!\Delta_{\!\mathrm{Q}}$	$^{\mathrm{C}}V_{\mathrm{Q}}$	c_{R_Q}	c_{M_Q}	c [∆] ∇	$c_{D_{\!$	$\frac{\mathbf{x}}{\left(\stackrel{\triangle}{\mathbf{w}}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{W}\right)^{1/3}}$	$\frac{\frac{h}{\left(\stackrel{\triangle}{w}\right)^{1/3}}$	c_{L_Q}	c_{D_Q}	T X	<u>1</u>	<u>h</u> L
						0	- Conclu	ded					
0.30 .30 .30 .30 .30 .30 .30	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .016 .052 .072 .098 .096 .092 .088	-0.200 185 175 111 060 069 126 169 216	0 .77 1.29 1.80 2.58 3.09 3.87 4.38 5.16	0.178 .208 .147 .098 .067 .041 .031	2.10 2.21 2.30 2.64 2.90 2.85 2.57 2.36 2.13	4.11 4.20 3.82 3.04 2.48	0.21 .20 .25 .25 .36 .46 .61 .69	1.4963 .5391 .2750 .1348 .0936 .0599 .0466	0.0798 .0934 .0660 .0440 .0299 .0184 .0137	0.330 .347 .361 .415 .455 .448 .404 .371	0.645 660 601 	0.033 .032 .039 .039 .057 .073 .096 .108
.30 .30 .30 .30 .30 .30	4.64 5.28 6.33 7.39 8.44 9.50 10.55 11.61	.079 .072 .062 .057 .052 .054 .052	255 294 355 401 421 472 493 524	5.67 6.45 7.74 9.02 10.31 11.60 12.89 14.18	.016 .012 .007 .005 .003 .003 .002	1.95 1.74 1.41 1.18 1.08 .81 .71	2.13 1.82 1.61 1.38 1.16 1.12	.79 .82 .88 .91 .93 .95 .96	.0278 .0216 .0150 .0110 .0084 .0067 .0054	.0073 .0052 .0031 .0021 .0015 .0012 .0010	.307 .273 .222 .185 .169 .128 .111	.334 .286 .253 .216 .182 .177 .149	.124 .130 .138 .142 .146 .149 .151
.40 .40 .40 .40 .40 .40	0 .63 1.06 1.48 2.11 2.53 3.17	0 .018 .072 .090 .139 .143	216 200 186 111 030 019 086	0 .74 1.23 1.72 2.46 2.96 3.70	.165 .238 .152 .115 .082	2.11 2.18 2.26 2.52 2.79 2.83 2.61	4.09 4.17 3.91 3.00	.05 .04 .08 .09 .17 .27	1.9950 .7188 .3666 .1797 .1248	.0898 .1294 .0825 .0624 .0446 .0282	.364 .377 .391 .435 .482 .489	.707 .721 .676	.009 .006 .014 .016 .030 .047
.40 .40 .40 .40 .40 .40	3.59 4.22 4.64 5.28 6.33 7.39 8.44	.132 .120 .113 .106 .093 .085 .078	149 221 267 328 407 471 508	4.19 4.93 5.42 6.16 7.39 8.62 9.85	.038 .025 .019 .014 .008 .006	2.40 2.16 2.01 1.79 1.52 1.31	2.53 2.17 1.88 1.74 1.49	.53 .61 .65 .70 .74 .78	.0622 .0449 .0371 .0288 .0200 .0147 .0112	.0205 .0135 .0105 .0076 .0046 .0031 .0022	.415 .374 .347 .310 .263 .226 .202	.438 .376 .326 .300 .258	.092 .106 .112 .120 .129 .135 .140
.50 .50 .50 .50 .50 .50 .50	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .024 .089 .105 .180 .188 .186 .177 .162	210 190 185 101 .036 036 101 204	0 .71 1.18 1.66 2.37 2.84 3.55 4.03 4.74	.190 .254 .153 .128 .093 .059 .044 .029	2.12 2.17 2.21 2.43 2.70 2.77 2.59 2.44 2.19	4.08 4.14 3.92 3.13 2.56	07 08 03 03 .05 .15 .33 .42	2.4938 .8985 .4583 .2246 .1560 .0999 .0777 .0562	.1197 .1599 .0962 .0809 .0586 .0371 .0275 .0182	.394 .404 .411 .452 .502 .516 .482 .455 .408	.760 .772 .730 .584	014 015 005 005 009 .029 .061 .078 .097

 $\begin{tabular}{ll} \begin{tabular}{ll} \be$

c_{Δ_Q}	c_{V_Q}	c_{R_Q}	c_{M_Q}	$c_{V_{\Delta}}$	$c_{D_{\!$	$\frac{\mathbf{x}}{\left(\frac{\triangle}{\mathbf{w}}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{\mathbf{w}}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	c_{L_Q}	c_{D_Q}	<u>x</u> L	<u>l</u>	<u>h</u> L
							= 0°	, ,					
0 0 0 0 0 0	0 .63 1.06 1.48 2.11 2.53 3.17 3.59	0 .001 .002 .004 .010 .018 .031	0 0 0 0 .011 .015 .035						0 0 0 0 0 0 0 0 0 0 0 0	0.0050 .0036 .0037 .0045 .0056 .0062		0.487 -786 -816 -865	0.056 .058 .056 .054 .052 .048
0 0 0 0 0 0	4.22 4.64 5.28 6.33 7.39 8.44 9.50	.048 .056 .071 .096 .125 .165	.067 .074 .100 .163 .222 .283 .384						0 0 0 0 0 0 0	.0054 .0052 .0051 .0048 .0046 .0046		.861 .857 .865 .854 .867	.044 .052 .044 .044 .044
.10 .10 .10 .10 .10 .10 .10	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .002 .007 .013 .025 .036 .071 .109 .246	.030 .035 .067 .081 .099 .109 .145 .163	0 .93 1.55 2.17 3.10 3.72 4.65 5.26 6.19	0.046 .057 .056 .051 .051 .065 .079	6.68 6.77 7.47 7.79 8.16 8.38 9.14 9.55 10.39	9.02 11.49 11.35 11.56 12.69	0.40 .38 .37 .36 .37 .33 .28 .26	.4988 .1797 .0917 .0449 .0312 .0200 .0155 .0112	.0100 .0124 .0119 .0112 .0112 .0142 .0169 .0276	0.554 .562 .620 .646 .677 .695 .759 .792 .862	.748 .953 .942 .959 	.03 .03 .03 .03 .03 .02 .02
.20 .20 .20 .20 .20 .20	0 .63 1.06 1.48 2.11 2.53 3.17 3.59	0 .002 .010 .021 .038 .055 .112 .183	.060 .066 .116 .156 .190 .185 .189	0 .83 1.38 1.93 2.76 3.31 4.14 4.69	.029 .053 .056 .050 .050 .064	5.30 5.35 5.79 6.10 6.40 6.35 6.40 6.35	8.04 9.57 9.57 	.23 .21 .18 .18 .18 .17 .14	.9975 .3594 .1833 .0898 .0624 .0399	.0100 .0180 .0192 .0171 .0172 .0224 .0284	.554 .559 .605 .638 .669 .664	1.000 1.000 1.000	.02 .01 .01 .01 .01 .01
.30 .30 .30 .30 .30 .30	0 1.06 1.48 2.11 2.53 3.17	0 .004 .016 .029 .056 .089 .169	.085 .090 .154 .201 .244 .228	0 .77 1.29 1.80 2.58 3.09 3.87	.045 .065 .060 .056 .062	4.66 4.63 5.08 5.18 5.40 5.32 5.17	7.62 8.36 8.36 8.36	.12 .10 .08 .07 .07 .06	1.4963 .5391 .2750 .1348 .0936 .0599	.0200 .0288 .0266 .0252 .0278	.557 .554 .608 .620 .646 .636 .618	.912 1.000 1.000	.01 .00 .00 .00
.40 .40 .40 .40 .40 .40 .40	0 .63 1.06 1.48 2.11 2.53 3.17	0 .005 .020 .029 .073 .108 .181	.107 .103 .174 .214 .264 .230 .180	0 .74 1.23 1.72 2.46 2.96 3.70	.046 .066 .050 .061 .063	4.17 4.15 4.38 4.52 4.69 4.58 4.40	7.25 7.59 7.59	.05 .04 .01 004 01 03 09	1.9950 .7188 .3666 .1797 .1248	.0249 .0359 .0266 .0328 .0337	.549 .546 .577 .595 .618 .603 .579	,955 1.000 1.000	.00 .00 .00 00 00
.50 .50 .50 .50 .50	0 1.06 1.48 2.11 2.53 3.17	0 .005 .024 .047 .084 .118 .219	.126 .113 .190 .248 .257 .205	0 .71 1.18 1.66 2.37 2.84 3.55	.040 .068 .068 .060 .059	3.85 3.81 4.00 4.16 4.17 4.05 3.87	7.05 7.05 7.05 7.05	0 01 05 06 08 10 19	2.4938 .8985 .4583 .2246 .1560	.0249 .0431 .0431 .0377 .0368 .0437	.546 .541 .567 .590 .592 .574 .549	1.000 1.000 1.000	0 000 000 01 01 02

TABLE III - Continued

$^{\mathrm{C}}\!$	c_{V_Q}	c_{R_Q}	c_{M_Q}	$c_{V_{\overline{\Delta}}}$	$c_{D_{\!$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{\mathtt{W}}\right)^{1/3}}$	$\frac{\frac{h}{\left(\frac{\triangle}{W}\right)^{1/3}}$	c_{L_Q}	c_{D_Q}	x L	<u>l</u>	<u>h</u> L
		1				Т	= 40						
0 0 0 0 0 0 0 0 0	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .001 .002 .002 .008 .014 .019 .026	0 0 0 0 .007 .012 .026 .036						0 0 0 0 0 0 0 0 0 0	0.0050 .0036 .0018 .0036 .0044 .0038 .0040	0.500 .500 .500 2.636 2.697 3.949 4.077 4.790	0.412 .568 .579 	0.060 .065 .065 .064 .063 .062 .061
0	4.64 5.28	.041	.080						0	.0038	5.543	.630	.059
0 0 0 0 0 0 0 0 0 0 0 0	6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72 14.77 15.83	.073 .096 .120 .150 .193 .230 .280 .320 .369 .418	.149 .186 .244 .283 .335 .409 .480 .533 .630 .682						0 0 0 0 0 0 0 0 0 0	.0036 .0035 .0034 .0033 .0035 .0034 .0035 .0034 .0340 .0330	5.795 5.466 5.743 5.364 4.982 5.079 4.923 4.792 4.897 4.702 4.805	.617 .611 .611 .600 .600 .609 .590 .600 .583	.059 .060 .059 .060 .061 .060 .061 .060
.10 .10 .10 .10 .10 .10 .10 .10 .10	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64 5.28 6.33	0 .002 .007 .012 .020 .028 .041 .049 .059 .068 .081	054 052 014 0 .011 .032 .114 .155 .181 .188 .201 .255	0 .93 1.55 2.17 3.10 3.72 4.65 5.26 6.19 6.21 7.74 9.29	0.046 .058 .051 .042 .040 .038 .035 .031 .029	4.85 4.91 5.71 6.03 6.40 6.71 8.40 9.27 9.76 9.88 10.14 11.19	9.30 9.43 9.22 9.48 8.99 8.65 8.32	0.40 .38 .36 .36 .32 .29 .32 .36 .40 .41	.4988 .1797 .0917 .0449 .0312 .0200 .0155 .0112 .0093 .0072	.0100 .0126 .0110 .0090 .0087 .0082 .0076 .0066 .0063 .0058	.403 .408 .474 .500 .531 .556 .697 .769 .810 .820 .841	.771 .782 .765 .786 .746 .718	.033 .031 .030 .030 .030 .027 .024 .027 .030 .033 .034
.10 .10 .10 .10 .10 .10 .10	7.39 8.44 9.50 10.55 11.61 12.66 13.72 14.77 15.83	.116 .141 .169 .204 .247 .294 .338 .385 .439	.280 .304 .395 .403 .464 .535 .595 .683	10.84 12.39 13.94 15.49 17.04 18.59 20.13 21.68 23.23	.020 .019 .017 .017 .017 .017 .016 .016	11.61 12.03 13.69 13.54 14.55 15.66 16.06 17.70	8.00 7.80 7.73 7.60 7.44 7.52 7.49 7.29 7.29	.46 .49 .49 .50 .52 .53 .52 .52	.0037 .0028 .0022 .0018 .0015 .0013 .0011 .0009	.0043 .0040 .0037 .0037 .0037 .0037 .0036 .0035	.964 .997 1.136 1.123 1.208 1.300 1.359 1.469	.664 .647 .641 .630 .617 .624 .622 .605	.038 .041 .041 .042 .043 .044 .043
.20 .20 .20 .20 .20 .20 .20 .20	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64	0 .003 .012 .020 .031 .041 .063 .082 .110	094 080 030 0 .025 .048 .146 .255 .403 .394	0 .83 1.38 1.93 2.76 3.31 4.14 4.69 5.52 6.07	.044 .063 .054 .041 .037 .037 .037 .036	3.97 4.10 4.54 4.78 5.00 5.20 6.01 6.92 8.12 8.05	8.11 8.24 8.06 8.30 8.36	.21 .20 .18 .20 .20 .17 .15 .12 .10	.9975 .3594 .1833 .0898 .0624 .0399 .0311 .0225	.0150 .0216 .0183 .0139 .0128 .0126 .0127 .0124 .0094	.415 .428 .474 .500 .523 .544 .628 .723 .849	.848 861 842 867 874	.023 .021 .019 .021 .021 .018 .016 .013 .011
.20 .20 .20 .20 .20 .20 .20 .20	5.28 6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72	.105 .127 .150 .166 .195 .221 .263 .308 .357	.399 .403 .404 .439 .484 .504 .548 .610	6.90 8.28 9.66 11.04 12.42 13.80 15.18 16.56 17.94	.022 .018 .016 .014 .013 .012 .011 .011	8.08 8.09 8.27 8.34 8.69 8.80 9.10 9.52 9.88	7.64 7.28 6.77 6.56 6.38 6.24 6.09 6.08 5.97	.22 .28 .32 .35 .37 .37 .39 .40	.0144 .0100 .0073 .0056 .0044 .0036 .0030 .0025	.0075 .0063 .0055 .0047 .0043 .0040 .0039 .0038	.844 .846 .864 .872 .908 .920 .951 .995	.799 .761 .707 .686 .667 .652 .637 .635	.023 .029 .033 .037 .039 .039 .041 .042

TABLE III - Continued

EXPERIMENTAL HYDRODYNAMIC DATA FOR A BODY OF REVOLUTION

C _{AQ}	c_{V_Q}	c_{R_Q}	c_{M_Q}	$c_{V_{\Delta}}$	$c_{D_{\!\!\!\!\! \Delta}}$	$\frac{\mathbf{x}}{\left(\frac{\triangle}{\mathbf{w}}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	c_{L_Q}	c_{D_Q}	X L	$\frac{l}{L}$	h L
							- Conclu	ded					
0.30 .30 .30 .30 .30 .30 .30 .30	0 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .003 .016 .027 .042 .056 .085 .116	-0.109 094 019 .015 .049 .074 .174 .293	0 .77 1.29 1.80 2.58 3.09 3.87 4.38 5.16	0.033 .064 .055 .042 .039 .038 .040	3.64 3.71 4.10 4.25 4.41 4.55 5.04 5.62 6.49	7.50 7.64 7.50 7.63 7.86	0.11 .10 .08 .08 .08 .08 .05 .03 01	1.4963 .5391 .2750 .1348 .0936 .0599 .0466	0.0150 .0288 .0247 .0189 .0175 .0170 .0180	0.436 .444 .490 .508 .528 .544 .603 .672	0.897 .914 .897 .912 	0.013 .012 .009 .009 .010 .010 .004 001
.30 .30 .30 .30 .30 .30	4.64 5.28 6.33 7.39 8.44 9.50 10.55 11.61	.209 .275 .150 .179 .207 .221 .251	.657 -630 -565 .616 .620	5.67 6.45 7.74 9.02 10.31 11.60 12.89 14.18	.043 .044 .017 .015 .013 .011 .010	7.31 7.22 6.88 7.10 7.10 7.16	7.95 6.65 6.27 5.95 5.75 5.59 5.45	02 05 .19 .24 .28 .30 .32	.0278 .0216 .0150 .0110 .0084 .0067 .0054	.0194 .0198 .0075 .0066 .0058 .0049 .0045	.874 864 823 .849 .849 .856	.951 .795 .750 .711 .688 .669	003 006 .022 .029 .031 .036 .036
.40 .40 .40 .40 .40	0 1.06 1.48 2.11 2.53 3.17	0 .005 .021 .034 .053 .071	112 092 004 .036 .074 .104 .201	0 .74 1.23 1.72 2.46 2.96 3.70	.046 .069 .057 .044 .041	3.41 3.49 3.77 3.91 4.05 4.15 4.46	7.09 7.22 7.11 7.19	.04 .03 .01 .01 .03 .01	1.9950 .7188 .3666 .1797 .1248	.0249 .0377 .0312 .0238 .0221	.449 .459 .497 .515 .533 .546 .587	.934 .951 .936 	.005 .001 .002 .002 .003
.40 .40 .40 .40 .40 .40	3.59 4.22 4.64 5.28 6.33 7.39 8.44	.148 .238 .320 .280 .193 .201 .231	.304 .484 .619 .828 .922 .828 .786	4.19 4.93 5.42 6.16 7.39 8.62 9.85	.042 .049 .055 .037 .018 .014	4.81 5.38 5.79 6.49 6.83 6.52 6.36	7.43 7.59 6.45 5.81 5.70	03 07 12 17 .10 .18	.0622 .0449 .0371 .0288 .0200 .0147 .0112	.0230 .0267 .0297 .0201 .0096 .0074	.633 .708 .762 .854 .900 .859 .838	.979 1.000 .850 .765 .750	00 01 01 02 .01 .02
.50 .50 .50 .50 .50 .50 .50	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .005 .026 .044 .066 .088 .137 .183 .360	.144 .218 .280	0 .71 1.18 1.66 2.37 2.84 3.55 4.03 4.74	.040 .074 .064 .047 .044 .043 .045	3.27 3.34 3.56 3.69 3.78 3.88 4.07 4.21 4.79	6.79 6.88 6.81 6.87 7.05	02 03 05 03 04 06 08 15	2.4938 .8985 .4583 .2246 .1560 .0999 .0777 .0562	.0249 .0467 .0403 .0296 .0275 .0274 .0284	.464 .474 .505 .523 .536 .551 .577 .597	.964 .976 .966 .974	00 00 00 00 00 00 01 02
							$\tau = 8^{\circ}$						
0 0 0 0 0 0 0 0 0 0	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64 5.28	.001 .002 .001 .005 .009	.007						0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 .0008 .0010 .0002 .0010 .0014	9.046 4.164 28.704 1.354 .500 .500	.306	0.07 .07 .07 .07 .07 .07 .07

TABLE III - Continued

c_{Δ_Q}	c_{V_Q}	c_{R_Q}	$^{\mathrm{C}_{\mathrm{M}_{\mathrm{Q}}}}$	$c_{V_{\Delta}}$	$c_{D_{\!$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{\overline{w}}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{\overline{w}}\right)^{1/3}}$	$^{\mathrm{C}}\mathrm{L}_{\mathrm{Q}}$	c_{D_Q}	<u>x</u> L	<u>l</u>	<u>h</u> L
						$\tau = 8^{\circ}$	- Contin	ued					
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	6.33 7.39 8.44 9.50 10.55 11.61 12.67 13.72 14.77 15.83 16.88	.002	0 0 0 .013 0 0 0 .023 .013						0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 .0001	0.500 -500 -500 -500 12.950 3.210	0	.084 084 085 .087 .085 .090
.10 .10 .10 .10 .10 .10 .10 .10	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.64 5.28	0 .002 .008 .011 .021 .026 .032 .037 .042 .043	120 105 093 082 129 023 0 0 0 008 011	0 .93 1.55 2.17 3.10 3.72 4.65 5.26 6.19 6.21 7.74	0.046 .067 .047 .042 .038 .030 .027 .022 .019	3.43 3.77 4.02 4.26 3.30 5.57 6.03 6.03 5.87 5.81	7.16 7.14 6.95 6.59 5.61	0.51 .49 .49 .53 .53 .50 .53 .57 .62 .68	.4988 .1797 .0917 .0449 .0312 .0200 .0155 .0112 .0093 .0072	.0100 .0144 .0101 .0090 .0081 .0064 .0058 .0047 .0040	.285 .313 .333 .354 .274 .462 .500 .500 .500 .487 .482	.594 .592 .577 .547 .511 .466	.043 .041 .044 .044 .042 .044 .047 .051 .056
.10 .10 .10 .10 .10 .10 .10	6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72 14.77 15.83	.064 .080 .098 .117 .135 .175 .178 .195 .218	012 017 020 022 028 029 062 034 079 062	9.29 10.84 12.39 13.94 15.49 17.04 18.59 20.13 21.68 23.23	.015 .013 .013 .012 .011 .010 .010 .009	5.78 5.68 5.65 5.62 5.50 5.50 4.94 5.44 4.73 5.01	5.38 5.15 5.05 5.12 5.05 4.97 4.89 4.79 4.66 4.48	.72 .73 .75 .76 .76 .76 .76	.0050 .0037 .0028 .0022 .0018 .0015 .0013 .0011 .0009	.0032 .0029 .0028 .0026 .0024 .0023 .0022 .0021 .0020	.482 .472 .469 .466 .456 .456 .410 .451 .392 .415	.447 .427 .419 .425 .419 .412 .406 .397 .387	.060 .061 .062 .063 .063 .063 .063 .063
.20 .20 .20 .20 .20 .20 .20 .20	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64	0 .005 .016 .020 .034 .043 .054 .060	201 186 145 129 073 134 .062 .070 .070	0 .83 1.38 1.93 2.76 3.31 4.14 4.69 5.52 6.07	.073 .084 .054 .045 .039 .032 .027	3.04 3.19 3.53 3.68 4.17 3.65 5.30 5.35 5.35 5.13	6.56 6.66 6.46 5.62	.28 .25 .26 .28 .25 .28 .33 .34	.9975 .3594 .1833 .0898 .0624 .0399 .0311 .0225	.0249 .0288 .0183 .0153 .0134 .0108 .0093 .0075 .0065	.318 .333 .369 .385 .436 .382 .554 .559 .559	.686 .694 .675 .658	.029 .026 .027 .029 .029 .026 .029 .035 .040
.20 .20 .20 .20 .20 .20 .20	5.28 6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72	.074 .086 .098 .117 .139 .160 .186 .208	.034 .011 0 024 038 027 052 032	6.90 8.28 9.66 11.04 12.42 13.80 15.18 16.56 17.94	.015 .013 .011 .010 .009 .008 .008 .008	5.05 4.88 4.78 4.59 4.59 4.49 4.59 4.59 4.54	5.11 4.72 4.56 4.48 4.36 4.19 4.07 4.09 3.91	.48 .52 .55 .58 .58 .59 .60	.0144 .0100 .0073 .0056 .0044 .0036 .0030 .0025	.0053 .0043 .0036 .0033 .0031 .0029 .0028 .0026	.528 .510 .500 .480 .480 .469 .489 .459 .474	.534 .494 .476 .468 .455 .438 .425 .427	.051 .055 .057 .060 .060 .061 .062 .062
.30 .30 .30 .30 .30 .30 .30	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .005 .022 .032 .047 .061 .083 .088	241 220 170 149 083 008 .102 .184 .184	0 .77 1.29 1.80 2.58 3.09 3.87 4.38 5.16	.056 .088 .065 .047 .042 .037 .031	2.96 3.08 3.32 3.45 3.77 4.14 4.67 5.08 5.06	6.27 6.38 6.19 6.22	.14 .13 .13 .16 .16 .14 .13 .19	1.4963 .5391 .2750 .1348 .0936 .0599 .0466	.0249 .0395 .0293 .0211 .0190 .0166 .0137	.354 .369 .397 .413 .451 .495 .559 .608	.750 763 741 744 660	.017 .015 .016 .019 .019 .017 .016 .023

TABLE III - Continued

C _{∆Q}	CAG	c_{R_Q}	c_{M_Q}	$c_{V_{\triangle}}$	$c_{\mathbb{D}_{\!\!\!\! \Delta}}$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{\overline{w}}\right)^{1/3}}$	$\frac{\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	c_{L_Q}	c_{D_Q}	<u>x</u> L	$\frac{l}{L}$	h L
						τ = 8 ⁰	- Conclu	ded					
0.30 .30 .30 .30 .30 .30 .30	4.64 5.28 6.33 7.39 8.44 9.50 10.55 11.61	0.093 .104 .110 .123 .139 .158 .182	0.146 .113 .065 .032 0 014 044	5.67 6.45 7.74 9.02 10.31 11.60 12.89 14.18	0.019 .017 .012 .010 .009 .008 .007	4.89 4.71 4.50 4.33 4.18 4.11 3.99 4.03	4.87 4.47 4.22 3.93 3.93 3.88 3.72	0.33 .37 .42 .46 .49 .50 .51	0.0278 .0216 .0150 .0110 .0084 .0067 .0054	0.0086 .0075 .0055 .0045 .0039 .0035 .0033	0.585 .564 .538 .518 .500 .492 .477 .482	0.583 .534 .504 .470 .470 .464 .444	0.040 .045 .050 .056 .059 .060 .061
.40 .40 .40 .40 .40 .40	0 .63 1.06 1.48 2.11 2.53 3.17	.008 .030 .041 .056 .074 .110	258 238 174 150 081 .013 .214	0 .74 1.23 1.72 2.46 2.96 3.70	.073 .099 .069 .046 .043	2.92 2.98 3.21 3.29 3.52 3.83 4.50	6.18 6.23 6.05 6.08	.04 .04 .04 .06 .06 .04	1.9950 .7188 .3666 .1797 .1248	.0399 .0539 .0376 .0252 .0231	.385 .392 .423 .433 .464 .505	.814 .820 .797 .801	.006 .005 .006 .008 .008 .006
.40 .40 .40 .40 .40	3.59 4.22 4.64 5.28 6.33 7.39 8.44	.122 .125 .121 .126 .136 .145	.310 .321 .281 .232 .154 .090	4.19 4.93 5.42 6.16 7.39 8.62 9.85	.035 .026 .021 .017 .013 .010	4.81 4.84 4.73 4.56 4.31 4.09 3.95	5.48 4.78 4.40 4.07 3.88	.07 .15 .22 .29 .34 .39	.0622 .0449 .0371 .0288 .0200 .0147 .0112	.0190 .0140 .0112 .0091 .0068 .0053 .0047	.633 .638 .623 .600 .567 .538	.722 .630 .579 .536	.009 .020 .029 .038 .045 .052
.50 .50 .50 .50 .50 .50	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .008 .038 .051 .070 .093 .134 .164	247 220 164 134 062 .054 .275 .441 .489	0 .71 1.18 1.66 2.37 2.84 3.55 4.03 4.74	.063 .108 .074 .050 .046 .043 .040	2.89 2.96 3.11 3.18 3.36 3.65 4.21 4.61 4.74	6.06 6.08 5.87 6.01	04 05 04 03 03 04 05 05	2.4938 .8985 .4583 .2246 .1560 .0999 .0777 .0562	.0399 .0683 .0467 .0314 .0290 .0268 .0255	.410 .420 .441 .451 .477 .518 .597 .654 .672	.859 .863 .833 .852 .780	005 007 006 004 004 006 007 007
						т	= 12 ⁰						
0 0 0 0 0 0 0 0	0 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64 5.28	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 007 007 007 008 012						000000000000000000000000000000000000000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		0.299	0.105 .105 .106 .107 .108 .108 .109
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72 14.77 15.83 16.88	0 0005	013 007 027 034 052						000000000000000000000000000000000000000	0 .0001	-3.960 -5.070	0	.112

TABLE III - Continued EXPERIMENTAL HYDRODYNAMIC DATA FOR A BODY OF REVOLUTION

c_{Δ_Q}	c_{V_Q}	c_{R_Q}	c_{M_Q}	$C^{\Lambda^{\nabla}}$	$c_{D_{\!$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	c_{L_Q}	c_{D_Q}	X L	$\frac{l}{L}$	h L
							12° - C					,	
0.10 .10 .10 .10 .10 .10 .10 .10	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64 5.28	0 .002 .009 .014 .019 .023 .027 .027 .027 .027	-0.146 140 131 113 086 082 092 107 123 134 154	0 .93 1.55 2.17 3.10 3.72 4.65 5.26 6.19 6.81 7.74	0.046 .075 .059 .039 .033 .025 .019 .014 .011	2.81 2.97 3.21 3.62 4.20 4.30 4.11 3.80 3.46 3.21 2.81	6.08 6.10 5.82 5.10 4.33	0.68 .68 .71 .72 .74 .77 .83 .90 .95 .97	0.4988 .1797 .0917 .0449 .0312 .0200 .0155 .0112 .0093 .0072	0.0100 .0162 .0128 .0085 .0072 .0054 .0042 .0030 .0023	0.233 .246 .267 .300 .349 .356 .341 .315 .287 .267	0.504 .506 .483 .423 .359	0.056 .056 .059 .060 .061 .064 .069 .074 .079
.10 .10 .10 .10 .10 .10 .10	6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72 14.77 15.83	.026 .026 .027 .027 .028 .028 .028 .028	186 206 214 235 247 255 287 275 275 281	9.29 10.84 12.39 13.94 15.49 17.04 18.59 20.13 21.68 23.23	.006 .005 .004 .003 .002 .002 .001 .001	2.16 1.73 1.58 1.14 .90 .71 .06 .28 .31	3.30 2.78 2.52 .02 .02 .02	1.05 1.07 1.07 1.09 1.10 1.14 1.13 1.13	.0050 .0037 .0028 .0022 .0018 .0015 .0013 .0011 .0009	.0013 .0010 .0008 .0006 .0005 .0004 .0003 .0003 .0002	.179 .144 .131 .095 .074 .059 .005 .023 .026	.273 .231 .209 .002 .002 .002	.087 .089 .089 .090 .091 .095 .094 .094
.20 .20 .20 .20 .20 .20 .20 .20	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64	0 .007 .019 .027 .042 .047 .052 .052 .055	235 217 206 182 114 086 086 104 144 167	0 .83 1.38 1.93 2.76 3.31 4.14 4.69 5.52 6.07	.102 .100 .072 .055 .043 .030 .024 .018	2.73 2.90 3.01 3.23 3.83 4.08 4.08 3.92 3.58 3.41	5.64 5.74 5.64 5.07	.35 .34 .35 .37 .38 .40 .49 .56 .61	.9975 .3594 .1833 .0898 .0624 .0399 .0311 .0225 .0186	.0349 .0341 .0247 .0189 .0147 .0104 .0081 .0062	.285 .303 .315 .338 .400 .426 .426 .410 .374 .356	.590 .600 .590 .530 .451	.037 .036 .037 .039 .040 .042 .052 .058 .063
.20 .20 .20 .20 .20 .20 .20	5.28 6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72	.055 .054 .051 .051 .052 .057 .058 .061	194 246 302 321 373 387 429 439 469	6.90 8.28 9.66 11.04 12.42 13.80 15.18 16.56 17.94	.012 .008 .006 .004 .004 .003 .003 .002	3.19 2.75 2.28 2.13 1.69 1.60 1.25 1.18	3.78 3.39 3.02 2.76 2.62 2.21 2.02	.69 .74 .78 .79 .81 .82 .84 .84	.0144 .0100 .0073 .0056 .0044 .0036 .0030 .0025	.0040 .0027 .0019 .0014 .0012 .0010 .0009 .0008	.353 .287 .238 .223 .177 .167 .131 .123	.395 .355 .316 .288 .273 .231 .212	.072 .077 .082 .083 .085 .086 .088 .088
.30 .30 .30 .30 .30 .30 .30 .30	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .007 .032 .036 .057 .071 .079 .083	287 271 250 220 129 060 036 062 107	0 .77 1.29 1.80 2.58 3.09 3.87 4.38 5.16	.078 .128 .074 .057 .049 .035 .029	2.72 2.81 2.93 3.08 3.56 3.88 4.00 3.88 3.66	5.53 5.66 	.17 .15 .18 .21 .20 .22 .30 .39 .46	1.4963 .5391 .2750 .1348 .0936 .0599 .0466	.0349 .0575 .0330 .0256 .0221 .0158 .0129	.326 .336 .351 .369 .426 .464 .479 .464	.662 .677 .660 .594	.020 .018 .021 .025 .024 .027 .036 .046
.30 .30 .30 .30 .30 .30 .30	10.55	.084 .080 .079 .079	190 271 348 393 455 501	5.67 6.45 7.74 9.02 10.31 11.60 12.89 14.18	.017 .013 .009 .006 .005 .004	2.27 1.99 1.78	3.73 3.38 3.04 2.80 2.77 2.48 2.41	.50 .55 .59 .63 .66 .67 .68	.0278 .0216 .0150 .0110 .0084 .0067 .0054	.0078 .0060 .0042 .0029 .0022 .0018 .0015	.420 .390 .344 .300 .272 .238 .213	.447 .404 .363 .335 .331 .297 .288	.060 .065 .071 .076 .079 .080

TABLE III - Continued

$^{\mathrm{C}}\Delta_{\mathrm{Q}}$	c_{V_Q}	c_{R_Q}	c_{M_Q}	$c_{V_{\triangle}}$	$c_{D_{\Delta}}$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{\mathbf{w}}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{W}\right)^{1/3}}$	c_{L_Q}	c_{D_Q}	X L	<u>l</u>	<u>h</u> L
						τ = 12 ^C							
0.40 .40 .40 .40 .40 .40	0 .63 1.06 1.48 2.11 2.53 3.17	0 .010 .041 .049 .074 .093	-0.308 288 269 235 114 040	0 .74 1.23 1.72 2.46 2.96 3.70	0.092 .136 .083 .061 .053	2.73 2.80 2.88 3.00 3.41 3.66 3.93	5.60 5.60 5.48 5.03	0.04 .03 .05 .09 .06 .08	1.9950 .7188 .3666 .1797 .1248	0.0499 .0737 .0449 .0332 .0290	0.359 .369 .379 .395 .449 .482 .518	0.737 .737 .722 .662	0.006 .004 .007 .011 .008
.40 .40 .40 .40 .40 .40	3.59 4.22 4.64 5.28 6.33 7.39 8.44	.111 .114 .114 .112 .112 .114 .107	.021 042 087 159 271 358 426	4.19 4.93 5.42 6.16 7.39 8.62 9.85	.032 .024 .020 .015 .010 .008	3.87 3.66 3.51 3.27 2.90 2.63 2.39	4.24 3.72 3.31 3.05 2.79	.24 .33 .38 .43 .51 .53	.0622 .0449 .0371 .0288 .0200 .0147 .0112	.0173 .0128 .0106 .0081 .0056 .0042 .0030	.510 .482 .462 .431 .382 .346	.489 .436 .402 .367	.03/ .04: .05/ .05/ .06/ .07/
.50 .50 .50 .50 .50 .50 .50	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .009 .050 .062 .088 .113 .139 .140	307 287 262 226 087 .012 .135 .119	0 .71 1.18 1.66 2.37 2.84 3.55 4.03 4.74	.071 .143 .090 .063 .056 .044 .035	2.73 2.78 2.86 2.96 3.31 3.56 3.85 3.81 3.67	5.54 5.51 5.42 5.05 4.23	05 05 03 01 02 01 .09 .13	2.4938 .8985 .4583 .2246 .1560 .0999 .0777 .0562	.0449 .0898 .0568 .0395 .0353 .0278 .0218	.387 .395 .405 .420 .469 .505 .546 .541	.786 -782 -769 -716 -600	008 000 000 000 000 .010 .010
						т	= 16°						
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64 5.28	0 0 0 0 .001 .001 .001	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0						0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0003 0002 0	0.500	0.077	0.139 .140 .140 .140 .140 .140 .139
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72 14.77 15.83 16.88	.001	011 012 022						0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0	.500 -2.797 -3.346	0 .002 .002	.14
.10 .10 .10 .10 .10 .10 .10 .10	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64 5.28	0 .005 .014 .015 .019 .022 .021 .020 .019 .019	138 135 135 119 101 191 147 167 183 195 206	0 .93 1.55 2.17 3.10 3.72 4.65 5.26 6.19 6.81 7.74	0.116 .117 .064 .039 .032 .019 .014 .010 .008	2.90 3.06 3.12 3.46 3.89 2.01 2.90 2.47 2.13 1.88	5.41 5.36 4.84 3.56 2.58	0.83 .82 .86 .87 .97 1.05 1.17 1.23 1.28 1.31	.4988 .1797 .0917 .0449 .0312 .0200 .0155 .0112 .0093	.0249 .0252 .0137 .0085 .0069 .0042 .0031 .0021 .0018	.241 .254 .259 .287 .323 .167 .241 .205 .177 .156 .136	.449 444 402 295 214 184	.06 .06 .07 .07 .08 .08 .09 .10 .10

TABLE III - Continued

c_{Δ_Q}	C_{V_Q}	c_{R_Q}	c_{M_Q}	$c^{\Lambda^{\nabla}}$	$c_{D_{\!$	$\frac{x}{\left(\stackrel{\triangle}{\underline{w}} \right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{\mathtt{w}}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	c_{L_Q}	c_{D_Q}	<u>x</u>	<u>l</u>	<u>h</u> L
						$\tau = 16^{\circ}$	- Conti						
0.10 .10 .10 .10 .10 .10 .10 .10	6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72 14.77 15.83	0.019 .019 .018 .019 .019 .023 .021 .023 .022	-0.222 241 251 260 271 267 271 286 287	9.29 10.84 12.39 13.94 15.49 17.04 18.59 20.13 21.68 23.23	0.004 .003 .002 .002 .001 .001 .001 .001	1.30 .93 .68 .50 .28 .37 .34 06	1.75 1.49 1.08 1.06 .98 .02 .59 .02	1.40 1.46 1.49 1.50 1.51 1.51 1.51	0.0050 .0037 .0028 .0022 .0018 .0015 .0013 .0011 .0009	0.0009 .0007 .0005 .0004 .0003 .0003 .0003 .0002 .0002	0.108 .077 .056 .041 .023 .031 .028 005 005	0.145 .124 .090 .088 .081 .002 .049 .002 .002	0.116 .121 .124 .125 .126 .126 .126 .126
.20 .20 .20 .20 .20 .20 .20 .20	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64	0 .009 .024 .032 .046 .050 .051 .048 .044	237 214 211 195 161 169 208 239 283 307	0 .83 1.38 1.93 2.76 3.31 4.14 4.69 5.52 6.07	.131 .126 .086 .061 .046 .030 .022 .014	2.67 2.90 2.97 3.12 3.43 3.39 3.06 2.79 2.40 2.21	5.17 5.21 4.76 3.80	.44 .42 .48 .51 .59 .67 .78 .85 .92	.9975 .3594 .1833 .0898 .0624 .0399 .0311 .0225 .0186	.0449 .0431 .0293 .0207 .0156 .0102 .0075 .0049	.279 .303 .310 .326 .359 .354 .320 .292 .251	.541 .545 -498 -397 -327	.046 .044 .050 .053 .062 .070 .081 .089 .096
.20 .20 .20 .20 .20 .20 .20	5.28 6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72	.036 .037 .036 .037 .036 .037 .037	336 383 427 450 471 491 497	6.90 8.28 9.66 11.04 12.42 13.80 15.18 16.56 17.94	.008 .005 .004 .003 .002 .002 .001 .001	1.94 1.55 1.18 .99 .81 .63 .59	2.41 2.02 1.84 1.35 1.33 1.19 .92 .99	1.02 1.06 1.14 1.16 1.18 1.19 1.19 1.20	.0144 .0100 .0073 .0056 .0044 .0036 .0030 .0025	.0026 .0018 .0013 .0010 .0008 .0007 .0005 .0005	.203 .162 .123 .103 .085 .066 .062	.252 .212 .192 .141 .139 .124 .096 .103	.107 .111 .119 .121 .123 .124 .124 .125
.30 .30 .30 .30 .30 .30 .30 .30	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .010 .039 .048 .074 .078 .078 .080	287 276 274 232 176 170 216 259 321	0 .77 1.29 1.80 2.58 3.09 3.87 4.38 5.16	.111 .156 .098 .074 .054 .035 .028	2.67 2.77 2.81 3.03 3.32 3.37 3.13 2.93 2.62	5.14 5.06 4.79 3.93 3.27	.23 .22 .27 .29 .34 .42 .55 .63	1.4963 .5391 .2750 .1348 .0936 .0599 .0466	.0499 .0701 .0440 .0332 .0243 .0156 .0124	.320 .331 .336 .362 .397 .403 .374 .351	.615 .605 .573 .470	.027 .026 .033 .035 .041 .050 .066
.30 .30 .30 .30 .30 .30 .30	4.64 5.28 6.33 7.39 8.44 9.50 10.55 11.61	.069 :065 .059 .054 .054 .055 .059	367 427 496 561 612 629 662 670	5.67 6.45 7.74 9.02 10.31 11.60 12.89 14.18	.014 .010 .006 .004 .003 .003 .002	2.40 2.10 1.76 1.41 1.15 1.10 .92	2.70 2.07 1.89 1.66 1.52 1.25	.76 .80 .86 .93 .96 .98 .99	.0278 .0216 .0150 .0110 .0084 .0067 .0054	.0064 .0047 .0029 .0020 .0015 .0012 .0011	.287 .251 .210 .169 .138 .131 .110	.323 .248 .226 .199 .182 .150 .141	.091 .096 .103 .112 .115 .117 .118 .119
.40 .40 .40 .40 .40 .40	0 .63 1.06 1.48 2.11 2.53 3.17	.051 .060 .098 .108	297 255	0 .74 1.23 1.72 2.46 2.96 3.70	.129 .169 .101 .081 .062	2.20 2.76 2.79 2.75 3.15 3.31 3.18	5.16 5.11 4.79 3.99	.07 .06 .12 .15 .19 .26	1.9950 .7188 .3666 .1797 .1248	.0698 .0916 .0550 .0440 .0337 .0220	.367 .362 .415 .436	.679 .673 .630 .526	.009 .008 .016 .020 .025 .034 .053
.40 .40 .40 .40 .40 .40	4.22 4.64 5.28 6.33 7.39	.106 .099 .093 .086	327 401 468 572 659		.032 .022 .017 .012 .008 .005	3.01 2.73 2.48 2.26 1.89 1.59 1.32	3.34 2.71 2.39 2.08 1.75	.48 .57 .64 .68 .74 .82	.0622 .0449 .0371 .0288 .0200 .0147	.0119 .0092 .0067 .0043 .0028	.359 .326 .297 .249	.440 .357 .314 .273	.064 .076 .084 .089 .098 .108

TABLE III - Continued

$^{\mathrm{C}}\!$	c_{V_Q}	c_{R_Q}	c_{MQ}	$c_{V_{\Delta}}$	$c_{D_{\Delta}}$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{h}{\left(\stackrel{\triangle}{\Psi}\right)^{1/3}}$	c_{L_Q}	c_{D_Q}	<u>x</u> L	<u>l</u>	<u>h</u> L
						τ = 16°							
0.50 .50 .50 .50 .50 .50	0 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .014 .064 .074 .120 .139 .146 .146	-0.307 296 301 241 155 113 129 196 314	0 .71 1.18 1.66 2.37 2.84 3.55 4.03 4.74	0.111 .183 .108 .086 .069 .046 .036	2.71 2.75 2.76 2.91 3.14 3.26 3.21 3.05 2.76	5.18 5.05 4.86 4.14 3.39	-0.06 06 0 .01 .04 .12 .24 .34 .45	2.4938 .8985 .4583 .2246 .1560 .0999 .0777 .0562	0.0698 .1150 .0678 .0539 .0434 .0292 .0227	0.385 .390 .392 .413 .446 .462 .456 .433 .392	0.735 .716 .690 .588	-0.009 009 .002 .006 .012 .034 .049
						т	= 20 ⁰						
0 0 0 0 0 0	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.64 5.28	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0						0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		0	0.17 .17 .17 .18 .18 .18 .18
0 0 0 0 0 0	6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72 14.77 15.83 16.88	.002	022						0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0	-2.367 -4.477 -2.215	0	.18
.10 .10 .10 .10 .10 .10 .10 .10 .10	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64 5.28	0 .007 .016 .022 .023 .020 .019 .020 .019 .019	147 152 145 141 153 163 174 195 213 215 224	0 .93 1.55 2.17 3.10 3.72 4.65 5.26 6.19 6.81 7.74	.162 .134 .094 .048 .029 .018 .014 .010	2.63 2.63 2.87 3.03 2.78 2.53 2.29 1.85 1.45 1.42	4.95 4.85 2.60 1.98 1.49	.97 .97 1.04 1.10 1.29 1.40 1.51 1.59 1.64 1.68	.4988 .1797 .0917 .0449 .0312 .0200 .0155 .0112 .0093 .0072	.0349 .0288 .0202 .0103 .0062 .0038 .0031 .0021 .0018	.218 .218 .238 .251 .231 .210 .190 .154 .121 .118	.410 .402 .314 .216 .165	.08 .08 .09 .10 .11 .12 .13 .13
.10 .10 .10 .10 .10 .10 .10 .10	6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72 14.77 15.83	.019 .021 .021 .022 .023 .026 .026 .027	247 255 255 275 275 308 311 308 311	9.29 10.84 12.39 13.94 15.49 17.04 18.59 20.13 21.68 23.23	.004 .004 .003 .002 .002 .001 .001	.74 .56 .56 .18 .18 46 50 43 46	1.24 .85 .85 .72 .77 .02 .02 .02	1.76 1.80 1.81 1.82 1.83 1.83 1.85 1.83	.0050 .0037 .0028 .0022 .0018 .0015 .0013 .0011 .0009	.0009 .0008 .0006 .0005 .0004 .0003 .0003 .0003	.062 .046 .046 .015 .015 038 041 036 038	.103 .071 .071 .060 .064 .002 .002 .002	.14 .14 .15 .15 .15 .15 .15 .15

TABLE III - Concluded

^C △Q,	c_{V_Q}	$^{\mathrm{C}}_{\mathrm{R}_{\mathrm{Q}}}$	C _{MQ}	c^{Λ^D}	$c_{D_{\Delta}}$	$\frac{\mathbf{x}}{\left(\frac{\triangle}{\mathbf{w}}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{\mathbf{w}}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{W}\right)^{1/3}}$	c_{L_Q}	c_{D_Q}	<u>x</u> L	L L	<u>h</u> L
						τ = 20	o - Conc	luded					
0.20 .20 .20 .20 .20 .20 .20 .20	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64	0 .013 .032 .044 .055 .052 .049 .046 .042	-0.247 247 244 220 228 247 287 318 360 379	0 .83 1.38 1.93 2.76 3.31 4.14 4.69 5.52 6.07	0.189 .168 .118 .072 .047 .029 .021 .014	2.53 2.60 2.67 2.92 2.90 2.73 2.38 2.10 1.74 1.57	4.82 4.80 4.01 3.02 2.27	0.50 .56 .61 .78 .88 1.01 1.11 1.20	0.9975 .3594 .1833 .0898 .0624 .0399 .0310 .0225 .0186	0.0648 .0575 .0403 .0247 .0162 .0098 .0072 .0047 .0038	0.264 .272 .279 .305 .303 .285 .249 .220 .182	0.504 -502 .419 .316 .237	0.052 .052 .059 .064 .081 .092 .106 .117 .125
.20	5.28 6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72	.041 .042 .043 .043 .042 .041 .043 .044	542 531	11.04	.008 .006 .005 .004 .003 .002 .002 .001	1.40 1.15 .91 .74 .64 .47 .22 .30	1.78 1.45 1.27 1.08 .98 .88 .71 .57	1.27 1.32 1.36 1.49 1.41 1.42 1.42 1.42	.0144 .0100 .0073 .0056 .0044 .0036 .0030 .0025	.0029 .0021 .0016 .0012 .0009 .0007 .0006 .0005	.146 .120 .095 .077 .067 .049 .023 .031	.186 .152 .132 .113 .103 .092 .075 .060	.133 .138 .142 .155 .147 .148 .148 .148
.30 .30 .30 .30 .30 .30	.63 1.06 1.48 2.11 2.53 3.17 3.59	0 .014 .049 .064 .089 .090 .084 .079	400	3.87 4.38	.156 .197 .131 .089 .063 .037 .027	2.59 2.63 2.70 2.93 2.88 2.81 2.51 2.25 1.93	4.82 4.75 4.22 3.20 2.48	.25 .25 .32 .36 .50 .61 .77 .86	1.4963 .5391 .2750 .1348 .0936 .0599 .0466	.0123	.310 .315 .323 .351 .344 .336 .300 .269	.577 .568 .504 .382	.030 .030 .038 .044 .060 .073 .092 .103
.30 .30 .30 .30 .30 .30 .30	5.28 6.33 7.39 8.44 9.50 10.55	.068 .064 .062 .064 .064 .064	529 596 639 680 710	6.45 7.74 9.02 10.31 11.60 12.89	.014 .010 .007 .005 .004 .003 .003	1.78 1.59 1.25 1.05 .84 .69 .58	1.96 1.63 1.36 1.18 1.04 .91	.99 1.05 1.11 1.15 1.18 1.21 1.21	.0278 .0216 .0150 .0110 .0084 .0067 .0054	.0046 .0031 .0023 .0018 .0014	.190 .149 .126 .100 .082 .069	.194 .163 .141 .124 .109	.119 .126 .132 .138 .141 .141 .145
. 140 . 140 . 140 . 140 . 140	0 .63 0 1.06 0 1.48 0 2.11 0 2.53	0 .017 .064 .079 .122 .125	28° 228° 528°	.74 1.23 7 1.72 6 2.46 5 2.96	.156 .212 .133 .101 .072	2.65 2.82 2.90 2.86	4.87 4.75 4.22 3.31	.07 .07 .15 .19 .32 .42	1.9950 .7188 .3666 .179 .1246	0 .0848 3 .1150 6 .0724 7 .0548 8 .0390	349 372 3 382 3 377	.626	.010 .020 .021 .04;
- 14 - 14 - 14 - 14 - 14	0 4.22 0 4.64 0 5.28 0 6.33 0 7.39		552 057 263 673 680	1 4.93 1 5.42 8 6.16 1 7.39 9 8.62	.032 .022 .017 .012 .007	2.08 1.91 1.67 1.34 1.09	2.60 2.08 1.72 1.47	.69 .80 .84 .90 .97 1.01	.044 .037 .028 .020	9 .0118 1 .0093 8 .0066 0 .0046 7 .0032	8 .27 ¹ 3 .25 ¹ 6 .220 0 .17 2 .14 ¹	.342 .273 .273 .226 .194	.10
	50 0 50 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	.07 .09 .15 .16 .15	634 227 5028 5326 5935 4	5 .71 3 1.18 5 1.66 4 2.37 55 2.84 3.55 4 4.03	.190 .217 .131 .107 .081 .050 .030	2.69 7 2.66 2.81 2.81 2.81 2.89 2.66 2.66 8 2.46	4.78 4.32 3.45	10 01 .01 .14	2.493 .898 .458 .224 .156 .099	8 .119 5 .136 6 .084 6 .067 0 .050 9 .031 .024	7 .38 .37 .40 .40 .41 .7 .37 .34	.67° .67° .67° .67° .61° .61° .61° .61° .61° .61° .61° .61	01 00 .00 .02 .03 .04 .05

TABLE IV

EXPERIMENTAL HYDRODYNAMIC DATA FOR A BODY OF REVOLUTION

OF FINENESS RATIO 12 WITH CHINE STRIPS

C _{△Q}	c_{V_Q}	c_{R_Q}	c_{M_Q}	$c_{V_{\Delta}}$	$c_{D_{\triangle}}$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$^{\mathrm{C}}_{\mathrm{LQ}}$	c_{D_Q}	Ľ	L L	h L
							r = 0°						
0 0 0 0 0	0 .63 1.06 1.48 2.11 2.53 3.17	0 0 .002 .003 .007 .014	0 .003 .007 .007 .009 .009						0 0 0 0 0 0	.0036 .0027 .0031 .0044 .0052		0.473 .480 .519 .705	0.042 .041 .041 .040 .040 .040
0 0 0 0 0 0 0 0	3.59 4.22 4.64 5.28 6.33 7.39	.035 .049 .059 .071 .096	.040 .060 .074 .099 .149				====		0 0 0 0 0 0	.0054 .0055 .0055 .0051 .0048		.807 .823 .823	.038 .037 .038 .038 .038
.10 .10 .10 .10	0 1.06 1.48 2.11 2.53	0 .002 .007 .011 .022 .033	.010 .015 .044 .065 .084 .092	0 •93 1.55 2.17 3.10 3.72	0.046 .058 .047 .046 .048	7.51 7.63 8.22 8.68 9.12 9.27	13.34	0.38 .40 .37 .38 .38	.4988 .1797 .0917 .0449 .0312	.0100 .0126 .0101 .0099 .0103	0.515 .524 .564 .596 .625 .636	.915	.026 .027 .025 .026 .026
.10 .10 .10 .10	3.17 3.59 4.22 4.64 5.28	.052 .067 .103 .162 .262	.114 .150 .194 .229	4.65 5.26 6.19 6.81 7.74	.048 .048 .054 .070	9.73 10.54 11.51 12.24 13.63	13.21 13.65 13.75	•37 •37 •36 •36 •31	.0200 .0155 .0112 .0093 .0072	.0104 .0104 .0116 .0150 .0087	.668 .723 .789 .840 .935	.906	.025 .025 .025 .025
.20 .20 .20 .20	0 .63 1.06 1.48 2.11	0 .003 .009 .016 .033	.031 .035 .074 .115	0 .83 1.38 1.93 2.76	.044 .047 .043 .043	6.07 6.09 6.43 6.77 7.14	11.13	.23 .23 .22 .21 .20	•9975 •3594 •1833 •0898	.0150 .0162 .0147 .0148	.524 .526 .555 .585 .617	.961	.020 .020 .019 .018
.20 .20 .20 .20	2.53 3.17 3.59 4.22 4.64	.046 .069 .099 .157 .216	.182 .203 .214 .235 .260	3.31 4.14 4.69 5.52 6.07	.042 .040 .045 .051 .058	7.36 7.54 7.58 7.80 8.02	11.20	.22 .20 .24 .20 .16	.0624 .0399 .0311 .0225 .0186	.0144 .0138 .0154 .0176	.636 .651 .655 .674 .693	.968	.019 .017 .021 .017
.30 .30 .30 .30 .30 .30 .30	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .004 .012 .022 .041 .056 .094 .136	.048 .054 .094 .166 .214 .241 .274 .273	0 .77 1.29 1.80 2.58 3.09 3.87 4.38 5.16	.045 .048 .045 .041 .039 .042 .047 .057	5.30 5.32 5.53 5.90 6.13 6.26 6.43 6.43 6.41	9.93 10.12 10.12 10.12	.12 .11 .09 .10 .09 .11 .10 .10	1.4963 .5391 .2750 .1348 .0936 .0599 .0466	.0200 .0216 .0202 .0184 .0175 .0188 .0211 .0254	.524 .526 .547 .583 .606 .619 .636 .634	1.000 1.000 1.000	.012 .011 .009 .010 .009 .011
.40 .40 .40 .40 .40 .40 .40	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .004 .014 .028 .054 .079 .139 .207	.115 .200 .249 .283 .309	.74 1.23 1.72 2.46 2.96 3.70 4.19	.037 .046 .047 .045 .045 .051 .059	4.82 4.83 4.99 5.28 5.43 5.55 5.65 5.57 5.48	9.15 9.19 9.19 9.19 9.19	.05 .03 .02 0 .01 .02 0	1.9950 .7188 .3666 .1797 .1248 .0799 .0622 .0449	.0200 .0252 .0257 .0243 .0246 .0278 .0322 .0372	.615	1.000 1.000 1.000	.003

TABLE IV - Continued

c_{Δ_Q}	c_{V_Q}	c_{R_Q}	$^{\mathrm{C}}\mathrm{M}_{\mathrm{Q}}$	$c_{V_{\triangle}}$	$^{\mathrm{C}}\mathrm{D}_{\!\Delta}$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$^{\mathrm{C}}\mathrm{L}_{\mathrm{Q}}$	$^{\mathrm{C}}_{\mathrm{D}_{\mathrm{Q}}}$	<u>x</u>	<u>1</u>	<u>h</u> L
						$\tau = 0^{\circ}$	- Concl	uded				10	
0.50 .50 .50 .50 .50 .50	0 .63 1.06 1.48 2.11 2.53 3.17 3.59	0 .004 .016 .033 .066 .101 .169 .245	0.085 .082 .137 .223 .270 .304 .289 .254	0 .71 1.18 1.66 2.37 2.84 3.55 4.03	0.032 .046 .048 .047 .050 .053	4.49 4.47 4.62 4.83 4.96 5.03 4.99 4.91	8.53 8.53 8.53	0 01 04 05 05 04 05 07	2.4932 .8985 .4583 .2246 .1560 .0999	0.0200 .0288 .0302 .0296 .0315 .0337 .0381	0.526 .524 .541 .566 .581 .589 .585	1.000 1.000 1.000	0 002 004 005 006 004 006
							τ = 4 ⁰						
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64 5.28	0 .001 .002 .002 .007 .012 .020 .026 .033 .041 .049	0 0 0 0 0 0 0 .005 .010 .020 .025 .040						000000000000000000000000000000000000000	0.0050 .0036 .0018 .0031 .0037 .0040 .0040 .0037 .0038 .0035	0.500 .500 .500 .500 .500 .994 1.448 1.798 1.787 2.243	0.433 470 482 505 523 526	0.051 .050 .050 .049 .047 .045 .045 .045
0 0 0 0 0 0 0 0 0 0	6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72 14.77 15.83 16.88	.063 .087 .113 .145 .179 .219 .247 .290 .326 .374 .423	.066 .080 .114 .139 .174 .214 .249 .289 .324 .364 .409					===	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	.0031 .0032 .0032 .0032 .0032 .0033 .0031 .0030 .0030	2.733 2.472 2.646 2.542 2.580 2.589 2.650 2.631 2.616 2.572 2.559	.523 .510 .523 .526 .523 .523 .519 .523 .523 .523	.044 .043 .046 .046 .045 .046 .045 .044 .045
.10 .10 .10 .10 .10 .10 .10 .10	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64 5.28	0 .002 .006 .012 .021 .029 .040 .045 .054 .058	110 105 080 069 049 045 0 .049 .095 .103 .119	0 .93 1.55 2.17 3.10 3.72 4.65 5.26 6.19 6.81 7.74	0.046 .050 .051 .044 .042 .037 .032 .028 .025	4.91 5.04 5.57 5.81 7.17 7.21 7.29 7.38 9.27 9.42 9.73	10.20 	0.43 .43 .42 .42 .44 .38 .39 .39 .43	0.4988 .1797 .0917 .0449 .0312 .0200 .0155 .0112 .0093 .0072	.0100 .0108 .0110 .0094 .0090 .0080 .0070 .0061 .0054	•337 •346 •382 •399 •492 •494 •500 •506 •636 •647 •668	.699 .692 .673 .685 .683	.030 .030 .029 .029 .029 .028 .026 .027 .027
.10 .10 .10 .10 .10 .10 .10 .10	6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72 14.77 15.83	.085 .102 .132 .165 .193 .230 .267 .308 .362 .390	.129 .144 .163 .189 .219 .255 .279 .323 .360 .394	9.29 10.84 12.39 13.94 15.49 17.04 18.59 20.13 21.68 23.23	.019 .017 .017 .017 .016 .016 .015 .015 .014	9.92 10.20 10.55 10.97 11.50 12.02 12.36 13.01 13.48 13.94	8.14 8.06 8.06 7.83 7.63	.50 .51 .52 .56 .57 .56 .57 .57	.0050 .0037 .0028 .0022 .0018 .0015 .0013 .0011 .0009	.0042 .0037 .0037 .0037 .0034 .0033 .0033 .0033	.681 .700 .723 .753 .789 .825 .848 .893 .924	.604 .579 .579 .558 .558 .553 .553 .537	.034 .035 .036 .038 .039 .039 .039 .039

TABLE IV - Continued

$^{\mathrm{C}}\!$	c_{V_Q}	c_{R_Q}	c_{M_Q}	$c_{V_{\Delta}}$	$c_{D_{\triangle}}$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	c_{L_Q}	c_{D_Q}	<u>x</u>	<u>l</u>	h L
						$\tau = 4^{\circ}$							
0.20 .20 .20 .20 .20 .20 .20 .20	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64	0 .003 .009 .018 .031 .040 .058 .071 .082	-0.180 170 127 105 079 060 0 .075 .214 .264	0 .83 1.38 1.93 2.76 3.31 4.14 4.69 5.52 6.07	0.044 .047 .048 .041 .037 .034 .032 .027	4.25 4.34 4.71 4.89 5.13 5.28 5.79 6.43 7.58 8.00	9.00 9.12 8.83 8.91 9.12	0.24 .23 .22 .23 .24 .23 .20 .20 .19	0.9975 .3594 .1833 .0898 .0624 .0399 .0311 .0225	0.0150 .0162 .0165 .0139 .0125 .0116 .0110 .0092	0.367 .375 .407 .422 .443 .456 .500 .555 .655	.788 .763 .770	0.021 .020 .019 .020 .021 .020 .017 .017 .016 .016
.20 .20 .20 .20 .20 .20 .20	5.28 6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72	.095 .101 .125 .155 .181 .216 .250 .287	.283 .279 .264 .264 .269 .294 .315 .339	6.90 8.28 9.66 11.04 12.42 13.80 15.18 16.56 17.94	.020 .015 .013 .013 .012 .011 .011	8.15 8.11 7.98 7.96 7.98 8.15 8.30 8.44 8.67	8.51 7.91 7.48 7.12 7.03 6.73 6.67 6.52 6.48	.25 .31 .35 .37 .40 .41 .43 .44	.0144 .0100 .0073 .0056 .0044 .0036 .0030 .0025	.0068 .0050 .0046 .0044 .0040 .0039 .0037 .0036	.704 .700 .689 .687 .689 .704 .717 .729 .749	.735 .683 .646 .615 .607 .581 .576 .563	.021 .027 .030 .032 .035 .036 .038 .038
.30 .30 .30 .30 .30 .30 .30 .30	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .003 .012 .024 .040 .051 .073 .093 .121	220 204 149 114 080 028 .005 .102 .289	0 .77 1.29 1.80 2.58 3.09 3.87 4.38 5.16	.033 .048 .049 .040 .035 .033 .032	3.97 4.06 4.31 4.50 4.67 4.94 5.08 5.55 6.47	8.50 8.56 8.38 8.32 8.56	.13 .12 .10 .12 .13 .12 .11 .09	1.4963 .5391 .2750 .1348 .0936 .0599 .0466	.0150 .0216 .0220 .0180 .0159 .0146 .0145	.392 .401 .426 .445 .462 .488 .502 .549	.841 .846 .828 .823	.013 .012 .010 .012 .013 .012 .011 .009
.30 .30 .30 .30 .30 .30	4.64 5.28 6.33 7.39 8.44 9.50 10.55 11.61	.130 .129 .136 .141 .172 .204 .233 .268	.419 .516 .475 .434 .403 .395 .384 .395	5.67 6.45 7.74 9.02 10.31 11.60 12.89 14.18	.027 .021 .015 .012 .011 .010 .009	7.10 7.57 7.35 7.16 6.99 6.95 6.89 6.93	8.21 7.61 6.95 6.72 6.36 6.18 6.04	.07 .11 .20 .24 .28 .31 .34	.0278 .0216 .0150 .0110 .0084 .0067 .0054	.0121 .0093 .0068 .0052 .0048 .0045 .0040	.702 .748 .727 .708 .691 .687 .681	.812 .752 .687 .664 .629 .611	.006 .011 .020 .023 .028 .031 .033
.40 .40 .40 .40 .40 .40	0 .63 1.06 1.48 2.11 2.53 3.17	0 .005 .016 .031 .049 .062	229 209 145 101 006 039 .029	0 .74 1.23 1.72 2.46 2.96 3.70	.046 .053 .052 .041 .036	3.82 3.90 4.11 4.26 4.58 4.46 4.70	8.14 8.22 8.05 8.05	.05 .04 .02 .04 .04 .04	1.9950 .7188 .3666 .1797 .1248	.0249 .0288 .0284 .0220 .0193 .0176	.416 .424 .447 .464 .498 .485	.886 .894 .876	.005 .004 .003 .004 .005 .005
.40 .40 .40 .40 .40 .40	3.59 4.22 4.64 5.28 6.33 7.39 8.44	.113 .146 .181 .197 .162 .186	.123 .318 .528 .744 .703 .636 .574	4.19 4.93 5.42 6.16 7.39 8.62 9.85	.032 .030 .031 .026 .015 .013	5.01 5.65 6.33 7.05 6.92 6.70 6.49	8.22 8.18 7.35 6.78 6.34	.01 02 03 02 .10 .17	.0622 .0449 .0371 .0288 .0200 .0147 .0112	.0176 .0164 .0168 .0142 .0081 .0068	.545 .615 .689 .767 .753 .729	.894 .890 .800 .738 .690	.001 002 003 003 .011 .019
.50 .50 .50 .50 .50 .50 .50	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .005 .019 .036 .060 .074 .105 .134 .187	209 189 120 079 045 0 .066 .159 .380	0 .71 1.18 1.66 2.37 2.84 3.55 4.03 4.74	.040 .054 .052 .043 .037 .033 .033	3.75 3.80 3.96 4.07 4.16 4.27 4.43 4.67 5.21	7.88 7.94 7.75 7.77 7.93	02 02 03 02 0 01 02 04 07	2.4938 .8985 .4583 .2246 .1560 .0999 .0777 .0562	.0249 .0341 .0330 .0270 .0231 .0210 .0208	.439 .445 .464 .477 .488 .500 .519 .547	.924 .931 .908 .911 .929	002 003 002 0 001 003 005 008

Table IV - Continued $\begin{tabular}{lllll} \hline EXPERIMENTAL HYDRODYNAMIC DATA FOR A BODY OF REVOLUTION \\ OF FINENESS RATIO 12 WITH CHINE STRIPS \\ \hline \end{tabular}$

^C △Q	c_{V_Q}	c_{R_Q}	c_{M_Q}	$c_{V_{\Delta}}$	$c_{D_{\Delta}}$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$^{\mathrm{C}}\mathrm{L}_{\mathrm{Q}}$	$^{\mathrm{C}}\mathrm{D}_{\mathrm{Q}}$	x L	<u>l</u>	<u>h</u> L
							$\tau = 8^{\circ}$						
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64 5.28	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0						000000000000000000000000000000000000000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		0.314	0.070 .076 .080 .082
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72 14.77 15.83 16.88	0	0						0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0		0	.07
.10 .10 .10 .10 .10 .10 .10 .10 .10	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64 5.28	0 .002 .007 .012 .018 .023 .028 .031 .034 .038	170 159 147 141 126 101 079 074 079 086 090	0 .93 1.55 2.17 3.10 3.72 4.65 5.26 6.19 6.81 7.74	0.046 .058 .051 .038 .033 .026 .022 .018 .016	3.58 4.54 4.50 4.26 4.61 5.19 5.66 5.75 5.66 5.53 5.44	7.80 7.70 7.40 7.13 6.41	0.61 .59 .61 .62 .62 .61 .62 .68 .72 .73	.4988 .1797 .0917 .0449 .0312 .0200 .0155 .0112 .0093	.01.00 .0126 .0110 .0081 .0072 .0056 .0048 .0038 .0035	0.246 .312 .295 .293 .316 .356 .398 .394 .388 .379	.528 .528 .507 .489 .440	.04 .04 .04 .04 .04 .04 .05
.10 .10 .10 .10 .10 .10 .10 .10	6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72 14.77 15.83	.075 .082 .082 .088	145 174 209 209 249 260 279 291	15.49 17.04 18.59 20.13 21.68	.011 .010 .008 .007 .006 .006 .005 .004 .004	4.94 4.36 3.77 3.15 3.59 2.41 2.22 1.88 1.66 1.67	5.51 4.97 4.78 4.58 4.28 4.09 4.07 3.63 3.30 3.14	.80 .84 .88 .88 .90 .91 .93 .93	.0050 .0037 .0028 .0022 .0018 .0015 .0013 .0011 .0009	.0023 .0021 .0017 .0016 .0013 .0012 .0010 .0009 .0008	.339 .299 .259 .216 .246 .165 .153 .114	.378 .341 .328 .314 .293 .281 .279 .249 .226 .215	.05 .05 .06 .06 .06
.20 .20 .20 .20 .20 .20 .20	2.11 2.53 3.17 3.59 4.22	013 019 029 039 050 050 0 053	231 225 194 150 075 054	.83 1.38 1.93 2.76 3.31 4.14 4.69	.051 .038 .036 .029 .024	3.46 3.56 3.81 3.88 4.15 4.54 5.15 5.35 5.37 5.30	7.30 7.14 7.12 6.75 6.26	.31 .30 .31 .32 .31 .31 .31 .41	.9975 .3594 .1833 .0898 .0624 .0399 .0311 .0225 .0186	.0200 .0234 .0174 .0130 .0122 .0100 .0082 .0067	.392 .445 .462	.583	.02 .02 .02 .02 .02 .02 .03

TABLE IV - Continued

C _{AQ}	$c^{\Lambda^{\delta}}$	C _{RQ}	$^{\mathrm{C}}_{\mathrm{M}_{\mathrm{Q}}}$	$c_{V_{\Delta}}$	$^{\mathrm{C}}_{\mathrm{D}_{\! \triangle}}$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$^{\mathrm{C}}_{\mathrm{L}_{\mathrm{Q}}}$	c_{D_Q}	$\frac{x}{L}$	$\frac{l}{L}$	$\frac{h}{L}$
						$\tau = 8^{\circ}$							
0.20 .20 .20 .20 .20 .20 .20	5.28 6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72	0.068 .073 .082 .087 .103 .118 .130 .142 .157	-0.080 125 164 204 261 275 331 371 397	6.90 8.28 9.66 11.04 12.42 13.80 15.18 16.56 17.94	0.014 .011 .009 .007 .007 .006 .006	5.13 4.76 4.42 4.17 3.68 3.59 3.16 2.87 2.70	5.69 5.17 4.83 4.56 4.27 4.19 3.95 3.87 3.66	0.49 .54 .58 .62 .64 .65 .65 .66	0.0144 .0100 .0073 .0056 .0044 .0036 .0030 .0025	0.0049 .0036 .0030 .0024 .0023 .0021 .0019 .0018	0.443 .411 .382 .356 .318 .310 .273 .248	0.491 .447 .417 .394 .369 .362 .341 .334	0.04 .05 .05 .05 .05 .05 .05
.30 .30 .30 .30 .30 .30	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .005 .019 .028 .041 .053 .069 .078 .085	330 320 285 269 229 170 049 0	0 .77 1.29 1.80 2.58 3.09 3.87 4.38 5.16	.056 .076 .057 .041 .037 .031 .027	3.39 3.45 3.64 3.73 3.92 4.23 4.83 5.06 5.11	6.95 6.98 6.72 6.74 6.20	.16 .13 .15 .16 .17 .16 .15 .19	1.4963 .5391 .2750 .1348 .0936 .0599 .0466	.0249 .0341 .0257 .0184 .0165 .0138 .0121	.335 .341 .360 .369 .388 .418 .477 .500	.687 .690 .664 .666	.03 .03 .03 .03 .03 .03
.30 .30 .30 .30 .30 .30	4.64 5.28 6.33 7.39 8.44 9.50 10.55 11.61	.088 .095 .101 .107 .120 .133 .147 .163	0 019 081 145 210 280 300 356	5.67 6.45 7.74 9.02 10.31 11.60 12.89 14.18	.018 .015 .011 .009 .008 .006 .006	5.06 4.98 4.67 4.35 4.06 3.73 3.64 3.39	5.50 5.06 4.72 4.39 4.16 3.89 3.80	.29 .35 .40 .45 .49 .52	.0278 .0216 .0150 .0110 .0084 .0067 .0054 .0044	.0082 .0068 .0050 .0039 .0034 .0029 .0026	.500 .492 .462 .430 .401 .369 .360	.544 .500 .466 .434 .411 .385 .376	. 02 . 03 . 04 . 04 . 05 . 05 . 05
.40 .40 .40 .40 .40 .40	0 1.06 1.48 2.11 2.53 3.17	0 .007 .026 .040 .054 .066 .089	355 340 306 285 239 170 019	0 .74 1.23 1.72 2.46 2.96 3.70	.064 .086 .068 .045 .038	3.37 3.43 3.57 3.62 3.80 4.03 4.54	6.94 6.89 6.70 6.73	.05 .03 .05 .07 .08 .05	1.9950 .7188 .3666 .1797 .1248 .0799	.0349 .0467 .0367 .0243 .0206 .0178	.367 .373 .388 .394 .413 .439	.756 .750 .729 .733	.00
.40 .40 .40 .40 .40 .40	3.59 4.22 4.64 5.28 6.33 7.39 8.44	.100 .107 .114 .122 .130 .139 .141	.070 .115 .105 .067 079 094 180	4.19 4.93 5.42 6.16 7.39 8.62 9.85	.029 .022 .020 .016 .012 .009	4.83 4.97 4.94 4.82 4.35 4.25 4.02	6.21 5.48 4.97 4.64 4.32	.06 .13 .18 .24 .32 .37 .41	.0622 .0449 .0371 .0288 .0200 .0147 .0112	.0155 .0120 .0106 .0088 .0065 .0051 .0040	.526 .541 .538 .524 .473 .462 .437	.676 .597 .540 .505 .470	.00 .01 .02 .03 .04
.50 .50 .50 .50 .50 .50	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .007 .030 .045 .062 .078 .110 .125	346 336 306 280 221 139 .015 .124 .241	0 •71 1.18 1.66 2.37 2.84 3.55 4.03 4.74	.055 .086 .065 .044 .039 .035 .031	3.38 3.41 3.49 3.57 3.71 3.92 4.31 4.57 4.86	6.87 6.83 6.59 6.63 6.24	04 05 03 0 0 01 02 02	2.4938 .8985 .4583 .2246 .1560 .0999 .0777 .0562	.0349 .0539 .0412 .0279 .0243 .0220 .0194 .0150	.396 .401 .409 .418 .435 .460 .505 .536	.805 .800 .772 .777	00 00 0 00 00

TABLE IV - Continued

C _{AQ}	c_{V_Q}	$^{\mathrm{C}}\mathrm{R}_{\mathrm{Q}}$	$^{\mathrm{C}}\mathrm{M}_{\mathrm{Q}}$	$c^{\Lambda^{\nabla}}$	$c_{D_{\triangle}}$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{\overline{w}}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	c_{L_Q}	c_{D_Q}	<u>x</u>	<u>Z</u>	<u>h</u> L
							τ = 12 ⁰						
0000000000	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64 5.28	0 .002 .003 .003 .001 0 0 0	0 014 014 019 015 0 0 004 004						000000000000000000000000000000000000000	0.0100 .0036 .0027 .0009 .0003 0	-5.064 -3.952 -3.210 -2.256 -10.630	0.154 .178 .095 .004 .025	0.105 .105 .106 .108 .113 .116 .119 .120 .121 .122
0 0 0 0 0 0 0 0 0 0 0 0	6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72 14.77 15.83 16.88	.001	0 019 0 029 020 009 089						0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	500 -8.828 -5.860 -2.256 -17.121	.004	.122 .122 .121 .120 .118 .118
.10 .10 .10 .10 .10 .10 .10 .10 .10	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64 5.28	0 .005 .012 .015 .022 .021 .024 .022 .022 .022	185 180 180 169 159 153 165 180 200 220 229	0 .93 1.55 2.17 3.10 3.72 4.65 5.26 6.19 6.81 7.74	0.116 .100 .064 .046 .031 .019 .017 .012 .009	3.21 3.37 3.43 3.68 3.92 4.08 3.83 3.52 3.09 2.66 2.47	6.57 6.41 6.03 5.02 4.20	0.79 .79 .84 .86 .88 .95 1.03 1.09 1.16 1.20	0.4988 .1797 .0917 .0449 .0312 .0200 .0155 .0112 .0093	.0249 .0216 .0137 .0099 .0066 .0042 .0037 .0025 .0020	.220 .231 .235 .252 .269 .280 .263 .242 .212 .182	.450 .440 .413 .344 .288	.054 .058 .059 .061 .065 .070 .075 .079 .082
.10 .10 .10 .10 .10 .10 .10	6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72 14.77 15.83	.022 .022 .022 .021 .024 .022 .022 .024 .025 .022	254 280 289 320 326 310 350 350 350	9.29 10.84 12.39 13.94 15.49 17.04 18.59 20.13 21.68 23.23	.005 .004 .003 .002 .002 .001 .001 .001	1.95 1.39 1.20 .56 .46 .77 09 28 06	2.48 2.21 1.96 1.70 1.44 1.18 1.13 .98 .71	1.31 1.32 1.35 1.38 1.38 1.39 1.39 1.40 1.40	.0050 .0037 .0028 .0022 .0018 .0015 .0013 .0011 .0009 .0008	.0011 .0008 .0006 .0005 .0004 .0003 .0003 .0003	.134 .095 .083 .038 .032 .053 006 019 004	.170 .152 .134 .117 .099 .081 .078 .067 .049	.090 .091 .093 .093 .094 .095 .095 .096
.20 .20 .20 .20 .20 .20 .20 .20	0 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64	0 .007 .021 .026 .041 .045 .047 .048 .049	295 289 281 269 236 220 224 245 285 300	0 .83 1.38 1.93 2.76 3.31 4.14 4.69 5.52 6.07	.102 .110 .070 .054 .041 .027 .022 .016	3.20 3.27 3.39 3.51 3.95 3.95 3.75 3.44 3.29	6.30 6.25 6.01 5.20 4.38	.41 .45 .49 .49 .54 .62 .69 .76 .82	.9975 .3594 .1833 .0898 .0624 .0399 .0311 .0225 .0186	.0349 .0377 .0238 .0184 .0140 .0094 .0075 .0055	.276 .282 .293 .303 .329 .341 .339 .324 .297 .284	.544	.036 .036 .039 .042 .046 .054 .060 .066

TABLE IV - Continued

c _{Aq}	c_{V_Q}	c_{R_Q}	$^{\mathrm{C}}_{\mathrm{M}_{\mathrm{Q}}}$	$^{\text{C}}V_{\Delta}$	$^{\mathrm{C}}_{\mathrm{D}_{\!\Delta}}$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$^{\mathrm{C}_{\mathrm{L}_{\mathrm{Q}}}}$	$^{\mathrm{C}}_{\mathrm{D}_{\mathrm{Q}}}$	T T	<u>1</u>	<u>h</u> L
						τ = 12							
0.20 .20 .20 .20 .20 .20 .20	5.28 6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72	0.046 .045 .045 .045 .045 .045 .045	-0.340 402 462 493 523 553 576 583 625	6.90 8.28 9.66 11.04 12.42 13.80 15.18 16.56 17.94	0.010 .006 .005 .004 .003 .002 .002 .002	2.94 2.41 1.93 1.64 1.40 1.16 .94 .88	3.64 3.13 2.74 2.37 2.17 1.96 1.66 1.55	0.87 .93 .96 .99 1.01 1.03 1.04 1.05	0.0144 .0100 .0073 .0056 .0044 .0036 .0030 .0025	0.0033 .0022 .0016 .0013 .0010 .0008 .0007 .0006	0.254 .208 .167 .142 .121 .100 .081 .076	0.314 .270 .237 .205 .187 .170 .143 .134	0.075 .080 .083 .086 .087 .089 .090 .091
.30 .30 .30 .30 .30 .30 .30	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .009 .031 .038 .055 .068 .074 .075	361 355 350 336 276 260 229 250	0 .77 1.29 1.80 2.58 3.09 3.87 4.38 5.16	.100 .124 .078 .055 .047 .033 .026	3.22 3.26 3.30 3.39 3.71 3.79 3.95 3.86 3.58	6.22 	.21 .25 .27 .28 .32 .39 .46	1.4963 .5391 .2750 .1348 .0936 .0599 .0466	.0449 .0557 .0348 .0247 .0212 .0148 .0117 .0089	.318 .322 .326 .335 .367 .375 .390 .382 .354	.615 .611 .592 .528	.021 .021 .024 .027 .028 .031 .039 .046
.30 .30 .30 .30 .30 .30 .30	4.64 5.28 6.33 7.39 8.44 9.50 10.55 11.61	.073 .073 .073 .066 .068 .067 .071	336 397 482 596 624 683 742	5.67 6.45 7.74 9.02 10.31 11.60 12.89 14.18	.015 .011 .008 .005 .004 .003 .003	3.43 3.14 2.72 2.16 2.01 1.24 1.46 1.30	3.85 3.32 2.97 2.61 2.43 2.20 1.89	.61 .67 .74 .76 .80 .83 .86	.0278 .0216 .0150 .0110 .0084 .0067 .0054	.0068 .0052 .0036 .0024 .0019 .0015 .0013	.339 .310 .269 .214 .199 .172 .144 .129	.381 .328 .293 .258 .240 .217 .187	.060 .066 .073 .075 .079 .082 .085
.40 .40 .40 .40 .40 .40	0 1.06 1.48 2.11 2.53 3.17	0 .011 .039 .049 .068 .090	391 387 387 362 279 270	0 .74 1.23 1.72 2.46 2.96 3.70	.101 .129 .083 .056 .052 .036	3.24 3.25 3.27 3.37 3.67 3.70 3.90	6.26 6.10 5.97 5.42	.06 .06 .09 .12 .13 .16	1.9950 .7188 .3666 .1797 .1248	.0549 .0701 .0449 .0305 .0281 .0198	.352 .354 .356 .367 .399 .403 .424	.682 .664 .650	.007 .007 .010 .013 .014 .017
.40 .40 .40 .40 .40 .40	3.59 4.22 4.64 5.28 6.33 7.39 8.44	.101 .102 .105 .101 .098 .096	220 279 336 416 523 635 722	4.19 4.93 5.42 6.16 7.39 8.62 9.85	.029 .021 .018 .013 .009 .006	3.88 3.69 3.48 3.24 2.87 2.49 2.21	4.60 3.91 3.37 3.13 2.86	.31 .40 .46 .53 .60 .63	.0622 .0449 .0371 .0288 .0200 .0147 .0112	.0157 .0115 .0097 .0073 .0049 .0035 .0026	.422 .401 .379 .352 .312 .271 .240	.500 -426 .367 .341 .311	.034 .043 .050 .057 .065 .068
.50 .50 .50 .50 .50 .50	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .012 .048 .060 .085 .107 .122 .130 .134	391 381 391 360 260 204 170 161 224	0 .71 1.18 1.66 2.37 2.84 3.55 4.03 4.74	.095 .137 .087 .061 .053 .039 .032	3.26 3.29 3.28 3.36 3.62 3.76 3.86 3.87 3.73	6.27 6.12 5.96 5.50 4.76	06 05 01 .02 .02 .03 .14 .20	2.4938 .8985 .4583 .2246 .1560 .0999 .0777 .0562	.0599 .0863 .0550 .0382 .0334 .0244 .0202	.382 .386 .384 .394 .424 .441 .452 .454 .437	.735 .717 .699 .645	007 006 001 .003 .003 .004 .016 .023 .038
							$\tau = 16^{\circ}$						
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64 5.28	0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0						000000000000000000000000000000000000000	000000000000000000000000000000000000000		0.078	0.139 .138 .138 .142 .142 .143 .143

 $\begin{tabular}{llll} TABLE IV - Continued \\ EXPERIMENTAL HYDRODYNAMIC DATA FOR A BODY OF REVOLUTION \\ \end{tabular}$

$^{\mathrm{C}}\!$	c_{V_Q}	c_{R_Q}	c_{M_Q}	$c_{V_{\Delta}}$	$c_{\mathbb{D}_{\Delta}}$	$\frac{x}{\left(\frac{\triangle}{\overline{w}}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{\overline{w}}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{\overline{w}}\right)^{1/3}}$	$^{\mathrm{C}}\mathrm{L}_{\mathrm{Q}}$	$^{\mathrm{C}}\mathrm{D}_{\mathrm{Q}}$	Ţ	L L	h L
							o - Cont						
0	6.33 7.39	0	0						0	0		0	0.142
0	8.44 9.50							J	0 0			0	
0	10.55 11.61 12.66	0	0						0				
0 0	13.72	0	0						0	0		.002	.138
0	15.83	0	101						0	0		0	.138
.10 .10 .10 .10 .10 .10 .10 .10 .10	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64 5.28	0 .007 .012 .019 .024 .021 .022 .022 .021 .021	185 192 186 185 194 194 214 229 247 250 260	0 .93 1.55 2.17 3.10 3.72 4.65 5.26 6.19 6.81 7.74	0.162 .100 .081 .050 .031 .020 .016 .011 .009	3.12 3.06 3.24 3.37 3.21 3.18 2.78 2.48 2.07 2.01 1.76	5.87 	1.01 1.01 1.07 1.10 1.20 1.34 1.45 1.54 1.65 1.70	.4988 .1797 .0917 .0449 .0312 .0200 .0155 .0112 .0093 .0072	.0349 .0216 .0174 .0108 .0066 .0044 .0034 .0024 .0019	0.214 .210 .223 .231 .220 .218 .191 .170 .142 .138 .121	.403 -399 -341 -254 -187	.069 .069 .074 .075 .083 .092 .100 .106 .113 .117
.10 .10 .10 .10 .10 .10 .10	6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72 14.77 15.83	.020 .021 .021 .021 .022 .024 .025 .025 .024	296 301 306 330 310 352 352 361 381	9.29 10.84 12.39 13.94 15.49 17.04 18.59 20.13 21.68 23.23	.005 .004 .003 .002 .002 .001 .001	.99 .93 .80 .31 .77 .25 09 09 28	1.60 1.18 1.08 .93 .88 .67 .77 0	1.69 1.78 1.79 1.83 1.83 1.84 1.85 1.87 1.86	.0050 .0037 .0028 .0022 .0018 .0015 .0013 .0011 .0009	.001.0 .0008 .0006 .0005 .0004 .0003 .0003 .0002	.068 .064 .055 .021 .053 .017 006 006 019	.109 .081 .074 .064 .060 .046 .053 0	.116 .122 .123 .125 .125 .126 .127 .128 .128
.20 .20 .20 .20 .20 .20 .20 .20	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64	0 .010 .025 .033 .047 .049 .049 .049	304 303 316 290 303 295 326 360 405 431	0 .83 1.38 1.93 2.76 3.31 4.14 4.69 5.52 6.07	.146 .131 .088 .062 .045 .029 .022 .015	3.07 3.14 3.07 3.34 3.27 3.34 3.09 2.80 2.41 2.19	5.79 5.68 5.10 4.15 3.18	.53 .58 .61 .70 .81 .94 1.02 1.12	.9975 .3594 .1833 .0898 .0624 .0399 .0311 .0225	.0499 .0449 .0302 .0211 .0153 .0098 .0076 .0053 .0042	.265 .271 .265 .288 .282 .288 .267 .242 .208 .189	.500 .491 .440 .358	.046 .045 .051 .052 .061 .070 .081 .088
.20 .20 .20 .20 .20 .20 .20	7.39 8.44 9.50 10.55 11.61 12.66	.043 .043 .041 .040 .040 .042	601 616 655		.009 .006 .005 .004 .003 .002 .002 .002	1.86 1.52 1.20 1.16 .81 .71 .61 .29	2.58 2.00 1.72 1.35 1.15 1.08 .94	1.20 1.23 1.31 1.35 1.38 1.39 1.40 1.41	.0144 .0100 .0073 .0056 .0044 .0036 .0030 .0025	.0021 .0016 .0012 .0009 .0007 .0006	.100 .070 .061 .053	.222 .173 .148 .117 .099 .094 .081	.104 .106 .113 .116 .119 .120 .121
.30 .30 .30 .30 .30 .30 .30	.63 1.06 1.48 2.11 2.53 3.17 3.59	.035 .043 .069 .078 .080	387 361 373 357 387	1.29 1.80 2.58 3.09 3.87 4.38	.140 .088 .069 .054 .036		5.79 5.60 5.16 4.29 3.41	.26 .26 .34 .35 .44 .53 .66 .76	1.4963 .5391 .2750 .1348 .0936 .0599 .0466	.0499 .0629 .0394 .0310 .0243 .0160 .0121	.310 .307 .322 .320 .331 .316	.554	.025 .033 .031 .043 .065

TABLE IV - Continued

EXPERIMENTAL HYDRODYNAMIC DATA FOR A BODY OF REVOLUTION

C _{△Q}	c_{V_Q}	$^{\mathrm{C}}_{\mathrm{R}_{\mathrm{Q}}}$	$^{\mathrm{C}}_{\mathrm{M}_{\mathrm{Q}}}$	$c_{V_{\Delta}}$	$^{\mathrm{C}}\mathrm{D}_{\!\Delta}$	$\frac{x}{\left(\frac{\triangle}{\overline{w}}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{\overline{w}}\right)^{1/3}}$	$^{\mathrm{C}}_{\mathrm{L}_{\mathrm{Q}}}$	$^{C}D_{Q}$	X L	r L	h L
						τ = 16	o - Conc	luded					
0.30 .30 .30 .30 .30 .30 .30	4.64 5.28 6.33 7.39 8.44 9.50 10.55 11.61	0.071 .068 .066 .065 .063 .062 .061	-0.537 597 679 747 766 832 852 902	5.67 6.45 7.74 9.02 10.31 11.60 12.89 14.18	0.015 .011 .007 .005 .004 .003 .002	2.45 2.16 1.74 1.42 1.30 .99 .90	2.80 2.29 1.89 1.63 1.38 1.29 1.04	0.93 .98 .99 1.07 1.12 1.14 1.17 1.18	0.0278 .0216 .0150 .0110 .0084 .0067 .0054 .0044	0.0066 .0049 .0033 .0024 .0018 .0014 .0011	0.242 214 .172 .140 .129 .098 .089 .064	0.277 .226 .187 .161 .136 .127 .102	0.092 .097 .098 .106 .111 .112 .115
.40 .40 .40 .40 .40 .40	0 1.06 1.48 2.11 2.53 3.17	0 .014 .047 .059 .093 .103	409 409 427 387 346 391 401	0 1.23 1.72 2.46 2.96 3.70	.129 .156 .100 .077 .059	3.15 3.18 3.13 3.29 3.45 3.31 3.27	5.78 5.58 5.35 4.48	.07 .08 .16 .16 .20 .34	1.9950 .7188 .3666 .1797 .1248 .0799	.0698 .0845 .0541 .0418 .0321 .0216	• 343 • 346 • 341 • 358 • 375 • 360 • 356	.629 .607 .583	.008 .009 .017 .018 .021 .038
.40 .40 .40 .40 .40 .40	3.59 4.22 4.64 5.28 6.33 7.39 8.44	.110 .103 .101 .099 .089 .086	457 539 603 687 812 902 961	4.19 4.93 5.42 6.16 7.39 8.62 9.85	.031 .021 .017 .013 .008 .006	3.10 2.82 2.61 2.32 1.91 1.60 1.41	3.59 3.01 2.39 2.21 1.75	.55 .67 .70 .77 .84 .92	.0622 .0449 .0371 .0288 .0200 .0147 .0112	.0171 .0116 .0094 .0071 .0044 .0032 .0023	.337 .307 .284 .252 .208 .174	.390 -328 .260 .240 .191	.060 .073 .076 .084 .091 .100
•50 •50 •50 •50 •50 •50 •50	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .014 .054 .071 .108 .132 .143 .142 .136	405 407 437 387 320 407 397 454 568	0 .71 1.18 1.66 2.37 2.84 3.55 4.03 4.74	.111 .154 .103 .077 .065 .045 .035 .024	3.20 3.20 3.15 3.29 3.47 3.28 3.31 3.17 2.89	5.85 5.67 5.38 4.54 3.66	07 05 .02 .05 .09 .20 .33 .44	2.4938 .8985 .4583 .2246 .1560 .0999 .0777 .0562	.0698 .0970 .0651 .0485 .0412 .0286 .0221	.375 .375 .369 .386 .407 .384 .388 .371 .339	.685 .664 .630 .532 .429	009 006 .002 .006 .011 .023 .039
							$\tau = 20^{\circ}$						
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64 5.28	0 .001 0 0 0 0 .001	0 007 004 004 0 068 004 009 009						000000000000000000000000000000000000000	0.0050	-3.740 	0.104	0.171 .167 .179 .181 .186 .187 .184 .184
000000000	6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72 14.77	.001	040						0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0	-1.317 -1.121 -6.858	.002	.189
0	15.83	.002	079						0	0	-14.215	.002	.18

TABLE IV - Continued

$^{\mathrm{C}}\!$	c_{V_Q}	c_{R_Q}	c_{M_Q}	$c_{V_{\triangle}}$	$c_{D_{\triangle}}$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$^{\mathrm{C}}\mathrm{L}_{\mathrm{Q}}$	$^{\mathrm{C}}_{\mathrm{D}_{\mathrm{Q}}}$	x L	<u>l</u>	<u>h</u> L
						τ = 20	O - Cont	inued					
0.10 .10 .10 .10 .10 .10 .10 .10	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64 5.28	0 .009 .016 .025 .027 .024 .024 .026 .024 .024	-0.194 210 210 226 229 230 255 276 280 291 310	0 .93. 1.55 2.17 3.10 3.72 4.65 5.26 6.19 6.81 7.74	0.208 .134 .106 .056 .035 .022 .019 .013 .010	2.84 2.66 2.75 2.53 2.50 2.44 1.92 1.51 1.42 1.14	5.43 5.18 4.12 2.81 1.98	1.23 1.28 1.30 1.42 1.60 1.72 1.87 1.95 2.05 2.10 2.14	0.4988 .1797 .0917 .0449 .0312 .0200 .0155 .0112 .0093 .0072	0.0449 .0288 .0229 .0121 .0075 .0048 .0040 .0029 .0022	0.195 .182 .189 .174 .172 .167 .131 .104 .098 .078	0.373 -355 -283 -192 -136 -099	0.085 .087 .089 .098 .110 .118 .128 .134 .140 .144
.10 .10 .10 .10 .10 .10 .10 .10	6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72 14.77 15.83	.027 .026 .027 .027 .028 .028 .031 .032 .031	411	9.29 10.84 12.39 13.94 15.49 17.04 18.59 20.13 21.68 23.23	.006 .005 .004 .003 .002 .002 .002 .001	.40 .36 .40 12 .18 22 34 34 -1.18	1.13 .93 .75 .41 .44 .93 .67 .16	2.23 2.29 2.33 2.36 2.37 2.37 2.37 2.37 2.38 2.38	.0050 .0037 .0028 .0022 .0018 .0015 .0013 .0011 .0009	.0013 .0010 .0008 .0006 .0005 .0004 .0004 .0003	.028 .025 .028 008 .013 015 023 023	.078 .064 .051 .028 .030 .064 .046 .011	.153 .157 .160 .162 .163 .163 .163 .164 .164
.20 .20 .20 .20 .20 .20 .20 .20	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64	0 .015 .032 .042 .056 .054 .054 .052	348 335 371 363 409 442 478	0 .83 1.38 1.93 2.76 3.31 4.14 4.69 5.52 6.07	.219 .168 .113 .074 .051 .032 .025 .017	2.87 2.78 2.80 2.98 2.72 2.88 2.41 2.11 1.82 1.64	5.44 5.21 4.42 3.35 2.45	.64 .68 .74 .78 .96 1.09 1.24 1.34 1.45	.9975 .3594 .1833 .0898 .0624 .0399 .0311 .0225	.0748 .0575 .0385 .0252 .0175 .0108 .0084 .0058	.248 .240 .242 .257 .235 .242 .208 .182 .157 .142	.470 .450 .381 .290	.055 .058 .064 .067 .083 .094 .107 .115 .125
.20 .20 .20 .20 .20 .20 .20	11.61	.051 .051 .049 .051 .052 .053 .053	561 595 605 645 663 674 674	6.90 8.28 9.66 11.04 12.42 13.80 15.18 16.56 17.94	.011 .007 .005 .004 .004 .003 .002 .002	1.42 1.10 .81 .74 .42 .27 .17 .20	1.92 1.44 1.19 1.06 .90 .74 .53	1.57 1.67 1.73 1.77 1.80 1.82 1.83 1.84	.0144 .0100 .0073 .0056 .0044 .0036 .0030 .0025	.0037 .0025 .0018 .0014 .0012 .0010 .0008 .0007	.017	.166 .124 .102 .092 .078 .064 .046	.136 .145 .149 .153 .155 .157 .158 .159
.30 .30 .30 .30 .30 .30	.63 1.06 1.48 2.11 2.53 3.17 3.59	.085	6436 9402 9472 9453 9509 5587	1.29 1.80 2.58	.185 .121 .089 .062	2.89 2.91 2.87 3.07 2.81 2.89 2.64 2.23 2.06	5.50 5.25 4.59 3.55 2.68	.31 .34 .43 .46 .63 .74 .82 1.02	1.4963 .5391 .2750 .1348 .0936 .0599 .0466	.0827 .0541 .0400 .0278 .0178	.284 .303 .278 .286 .261		.031 .034 .042 .046 .063 .074 .081
.30 .30 .30 .30 .30 .30	5.28 6.33 7.39 8.44 9.50 10.55	.076 .078 .078 .071 .071	6709 8787 8862 4851 4888 5918	6.45 7.74 9.02 10.31 11.60 12.89	.012 .009 .006 .005 .004 .003	1.86 1.61 1.24 .92 .92 .73 .60	2.03 1.66 1.50 1.54 .89 .88	1.20 1.26 1.37 1.42 1.47 1.51 1.53	.0278 .0216 .0150 .0110 .0084 .0067 .0054	.0055 .0039 .0029 .0021 .0016	.159 .123 .091 .091 .072	.201 .164 .148 .152 .088	.136 .140 .146 .149

TABLE IV - Concluded

$^{\mathrm{C}}\!$	C _{VQ}	C_{R_Q}	C_{M_Q}	$c^{\Lambda^{\nabla}}$	$c_{D_{\Delta}}$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	c_{L_Q}	c_{D_Q}	<u>x</u> L	<u>l</u> L	<u>h</u> L
						τ = 20	O - Conc	luded					
0.40 .40 .40 .40 .40 .40	0 .63 1.06 1.48 2.11 2.53 3.17	0 .022 .060 .073 .118 .125	-0.436 454 474 436 528 503 573	0 .74 1.23 1.72 2.46 2.96 3.70	0.202 .199 .123 .098 .072	3.02 2.98 2.98 3.12 2.87 2.98 2.73	5.51 5.27 4.69 3.78	0.09 .13 .23 .26 .42 .52 .69	1.9950 .7188 .3666 .1797 .1248	0.1097 .1078 .0669 .0530 .0390 .0250	0.329 .324 .324 .339 .312 .324 .297	0.599 -574 -510 -411	0.010 .014 .025 .028 .045 .056 .075
.40 .40 .40 .40 .40 .40	3.59 4.22 4.64 5.28 6.33 7.39 8.44	.122 .115 .109 .106 .102 .101	637 737 791 864 972 -1.031 -1.100	4.19 4.93 5.42 6.16 7.39 8.62 9.85	.035 .024 .019 .014 .009 .007	2.54 2.18 2.00 1.76 1.39 1.19	2.89 2.30 1.83 1.56 1.30	.80 .92 .91 1.07 1.18 1.24 1.29	.0622 .0449 .0371 .0288 .0200 .0147 .0112	.0190 .0129 .0101 .0076 .0051 .0037 .0029	.276 .237 .218 .191 .151 .129	.314 .251 .200 .170	.087 .101 .108 .117 .128 .135 .141
.50 .50 .50 .50 .50 .50 .50	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .024 .072 .089 .150 .159 .161 .155	431 448 494 543 574 543 595 678 806	0 .71 1.18 1.66 2.37 2.84 3.55 4.03 4.74	.190 .205 .129 .107 .079 .051 .038	3.11 3.10 3.00 2.89 2.88 2.97 2.84 2.64 2.31	5.59 5.35 4.79 3.86 	10 04 .05 .07 .23 .35 .51 .63	2.4938 .8985 .4583 .2246 .1560 .0999 .0777 .0562	.1197 .1294 .0816 .0674 .0496 .0321 .0241	.365 .363 .352 .339 .337 .348 .333 .310	.655 .627 .562 .452	012 005 .005 .009 .027 .042 .060 .074

TABLE V

EXPERIMENTAL HYDRODYNAMIC DATA FOR A BODY OF REVOLUTION

OF FINENESS RATIO 6 WITHOUT CHINE STRIPS

$^{\mathrm{C}}\!\Delta_{\!\mathrm{Q}}$	c_{V_Q}	c_{R_Q}	c_{M_Q}	$c_{V_{\Delta}}$	$c_{D_{\Delta}}$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	c_{L_Q}	c_{D_Q}	Ţ	<u>L</u>	<u>h</u> L
							τ = 0 ⁰						
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 0 .001 .004 .013 .028 .089 .153 .518	0 0 0 0 .020 .031 .117 .157						000000000000000000000000000000000000000	.0018 .0037 .0058 .0087 .0178 .0238 .0582		.758	0.082 .082 .081 .078 .071 .064 .041 .030
.10 .10 .10 .10 .10 .10	0 .63 1.06 1.48 2.11 2.53 3.17 3.59	0 .002 .009 .016 .033 .051 .113 .212	.011 .018 .052 .062 .072 .103 .138	0 .93 1.55 2.17 3.10 3.72 4.65 5.26	0.046 .075 .068 .069 .074 .104	4.79 4.98 5.69 5.90 6.12 6.77 7.63 8.31	6.82 7.73 8.81 9.19	0.45 .44 .42 .43 .40 .31 .20	.4988 .1797 .0917 .0449 .0312 .0200	.0100 .0161 .0147 .0148 .0159 .0225 .0329	0.522 .542 .620 .643 .667 .737 .832 .906	.744 .842 .960	.049 .048 .045 .047 .044 .034 .021
.20 .20 .20 .20 .20 .20 .20	0 .63 1.06 1.48 2.11 2.53 3.17 3.59	0 .002 .016 .026 .042 .075 .183 .318	.034 .042 .097 .128 .117 .127 .139	0 .83 1.38 1.93 2.76 3.31 4.14 4.69	.029 .084 .070 .055 .068 .107	3.93 3.97 4.47 4.74 4.63 4.71 4.81 4.63	7.30 7.30	.25 .23 .19 .19 .19 .14 03	.9975 .3594 .1833 .0898 .0624 .0399	.0100 .0287 .0238 .0188 .0234 .0365 .0494	.539 .545 .613 .650 .636 .646 .660	.870 1.000 1.000	.035 .032 .026 .026 .026 .019 004
.30 .30 .30 .30 .30 .30	0 .63 1.06 1.48 2.11 2.53 3.17	0 .005 .028 .045 .068 .113	.050 .054 .127 .174 .154 .139	0 .77 1.29 1.80 2.58 3.09 3.87	.056 .112 .092 .068 .079	3.43 3.43 3.81 4.03 3.95 3.86 3.75	5.89 6.38 6.38	.14 .12 .08 .09 .08 .02	1.4963 .5391 .2750 .1348 .0936	.0249 .0502 .0412 .0305 .0352 .0445	•539 •539 •599 •633 •620 •606 •589	.926 1.000 1.000	.022 .019 .012 .013 .012 .003 026
.40 .40 .40 .40 .40 .40	2.53	0 .005 .040 .061 .082 .122 .285	.195	2.96	.046 .132 .103 .068 .070	3.09 3.09 3.41 3.54 3.39 3.29 3.08	5.60 5.79 5.79	.07 .04 01 01 01 07 35	1.9950 .7188 .3666 .1797 .1248	.0249 .0717 .0559 .0368 .0380	•535 •535 •589 •613 •586 •569	1.000	.012 .007 002 001 012 060
.50 .50 .50 .50 .50	.63 1.06 1.48 2.11 2.53	.052 .073 .099	.169 .201 .134 .097	.71 1.18 1.66 2.37 2.84	.055 .148 .106 .071 .078 .113	2.87 2.84 3.11 3.18 3.02 2.93 2.70	5.38 5.38 5.38 5.38 5.38 5.38	0 04 11 10 11 20 44	2.4938 .8985 .4583 .2246 .1560	.0349 .0933 .0669 .0444 .0489	•535 •529 •579 •593 •562 •545 •502	1.000 1.000 1.000 1.000 1.000 1.000	0 007 020 019 020 038 082
							$\tau = 4^{\circ}$						
0 0 0 0	0 1.06 1.48 2.11	.001	- 0						0 0 0	0 .0018 .0037 .0054	.500	.421	0.087 .082 .082 .079
0 0 0 0	2.53 3.17 3.59 4.22 4.61	.068	.087	7 6					0 0 0 0	.0081 .0136 .0190 .0243 .0324	5.495 7.973	.814	.064 .050 .037 .013

TABLE V - Continued EXPERIMENTAL DYDRODYNAMIC DATA FOR A BODY OF REVOLUTION

$^{\mathrm{C}}_{\Delta_{\mathrm{Q}}}$	c_{V_Q}	c_{R_Q}	c_{M_Q}	$c_{V_{\Delta}}$	$^{\mathrm{C}}\mathrm{D}_{\!\Delta}$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{\overline{w}}\right)^{1/3}}$	$^{\mathrm{C}}_{\mathrm{L}_{\mathrm{Q}}}$	$^{C}D_{Q}$	X L	<u>l</u>	h L
						$\tau = 4^{\circ}$		uded					
0.10 .10 .10 .10 .10 .10 .10	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .002 .009 .014 .028 .047 .101 .146 .262	-0.029 020 .007 .017 .034 .057 .141 .283	0 .93 1.55 2.17 3.10 3.72 4.65 5.26 6.19	0.046 .075 .059 .059 .068 .093 .105	3.96 4.14 4.73 4.94 5.28 5.78 7.42 10.14 14.77	6.85 7.70 8.06 8.42	0.45 .43 .41 .43 .40 .35 .25 .13	0.4988 .1797 .0917 .0449 .0312 .0200 .0155	0.0100 .0161 .0128 .0126 .0146 .0201 .0227 .0294	0.431 .451 .515 .539 .576 .630 .808 1.104 1.609	0.746 .839 .878 .918	0.049 .047 .044 .047 .044 .038 .027 .014
.20 .20 .20 .20 .20 .20 .20	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .002 .016 .028 .045 .066 .110 .163	046 040 .021 .047 .064 .009 .209 .335 .637	0 .83 1.38 1.93 2.76 3.31 4.14 4.69 5.52	.029 .084 .075 .059 .060 .064 .074	3.23 3.29 3.80 4.02 4.17 4.36 5.35 6.35 8.49	6.44 6.69 6.69 6.97	.25 .22 .19 .21 .21 .17 .08	.9975 .3594 .1833 .0898 .0624 .0399 .0311	.01.00 .02.87 .02.56 .02.02 .02.06 .02.19 .02.53 .03.90	.444 .451 .522 .552 .572 .599 .734 .872 1.165	.884 .918 .918 .957	.035 .030 .026 .029 .029 .023 .011 002
.30 .30 .30 .30 .30 .30 .30	0 .63 1.06 1.48 2.11 2.53 3.17 3.59	0 .004 .024 .038 .059 .078 .146 .247	058 045 .037 .071 .098 .119 .241	0 .77 1.29 1.80 2.58 3.09 3.87 4.38	.045 .096 .078 .059 .054 .065	2.90 2.96 3.37 3.51 3.64 3.75 4.33 4.97	5.88 6.16 6.25	.14 .12 .08 .10 .09 .07 01	1.4963 .5391 .2750 .1348 .0936 .0599	.0200 .0430 .0348 .0265 .0243 .0291 .0384	.455 .465 .529 .552 .572 .589 .680 .781	.923	.022 .019 .013 .015 .014 .011 001
.40 .40 .40 .40 .40 .40 .40	0 .63 1.06 1.48 2.11 2.53 3.17 3.59	.005 .031 .045 .071 .094 .163	556 040 .062 .098 .135 .151 .283	0 .74 1.23 1.72 2.46 2.96 3.70 4.19	.046 .102 .076 .059 .054 .060	2.69 2.75 3.09 3.22 3.33 3.39 3.82 4.32	5.55 5.79 5.79 5.79	.06 .04 0 .01 0 02 12 33	1.9950 .7188 .3666 .1797 .1248 .0799 .1622	.0249 .0556 .0412 .0319 .0293 .0325 .0492	.465 .475 .535 .556 .576 .586 .660	1.000 1.000 1.000	.010 .007 0 .001 0 004 021
.50 .50 .50 .50 .50	0 .63 1.06 1.48 2.11 2.53 3.17	0 .005 .045 .061 .089 .120 .242	046 020 .077 .117 .146 .169	0 .71 1.18 1.66 2.37 2.84 3.55	.040 .128 .089 .063 .059	2.57 2.62 2.87 2.96 3.04 3.09 3.49	5.38 5.38 5.38	01 03 07 05 07 10 25	2.4938 .8985 .4583 .2246 .1560	.0249 .0807 .0559 .0399 .0374 .0483	.478 .488 .535 .552 .566 .576 .650	1,000	001 006 013 010 013 018
				,			$\tau = 8^{\circ}$						
0 0 0 0 0	.63 1.06 1.48 2.11	.001 .004 .009	0 0 0 0	===					0 0 0 0	0 .0018 .0037 .0040	0.500 .500 .500	0.480 .438 	0.095 .094 .094 .091 .084
0 0 0 0 0	2.53 3.17 3.59 4.22 4.64	.021 .066 .118 .226	.011 .087 .235 .667 .958			===	===		0 0 0 0 0	.0066 .0132 .0183 .0254 .0301	1.401 2.801 3.865 5.502 5.515	.727	.076 .570 .040 .010

TABLE V - Continued

EXPERIMENTAL HYDRODYNAMIC DATA FOR A BODY OF REVOLUTION

OF FINENESS RATIO 6 WITHOUT CHINE STRIPS

	c_{V_Q}	c_{R_Q}	c_{M_Q}	$c_{V_{\Delta}}$	$^{\mathrm{C}}\mathrm{D}_{\!\Delta}$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{\mathtt{w}}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{\overline{w}}\right)^{1/3}}$	$^{\mathrm{C}}\mathrm{L}_{\mathrm{Q}}$	$^{\mathrm{C}}_{\mathrm{D}_{\mathrm{Q}}}$	<u>x</u> L	<u>l</u>	<u>h</u> L
						τ = 8°	- Concl						
0.10 .10 .10 .10 .10 .10 .10	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .002 .009 .014 .031 .049 .103 .157 .266	-0.067 064 034 029 007 .027 .179 .354 .774	0 .93 1.55 2.17 3.10 3.72 4.65 5.26 6.19	0.046 .075 .059 .064 .071 .095 .113	3.12 3.18 3.86 3.96 4.42 5.13 7.97 10.91 16.81	6.31 6.57 6.57 7.34	0.52 .46 .44 .47 .44 .37 .24 .10	0.4988 .1797 .0917 .0449 .0312 .0200 .0155 .0112	0.0100 .0161 .0128 .0139 .0153 .0205 .0244 .0298	0.340 .347 .421 .431 .481 .559 .869 1.189 1.832	0.687 .716 .716 .800	0.056 .050 .048 .052 .048 .041 .027 .011
.20 .20 .20 .20 .20 .20 .20	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .004 .019 .026 .042 .063 .129 .176 .324	107 092 046 030 003 .047 .250 .454 .890	0 .83 1.38 1.93 2.76 3.31 4.14 4.69 5.52	.059 .100 .070 .055 .057 .075 .080	2.72 2.85 3.27 3.39 3.61 4.00 5.28 6.08 6.21	5.64 5.91 5.83 6.42	.28 .27 .26 .28 .27 .20 .09 .01	.9975 .3594 .1833 .0898 .0624 .0399 .0311	.0200 .0341 .0238 .0188 .0196 .0257 .0273 .0364	.374 .391 .444 .465 .495 .549 .724 .835 .852	.800	.038 .036 .035 .038 .036 .028 .012 .001
.30 .30 .30 .30 .30 .30	0 .63 1.06 1.48 2.11 2.53 3.17 3.59	0 .005 .028 .038 .059 .080 .139 .233	134 107 047 025 .011 .072 .354 .566	0 .77 1.29 1.80 2.58 3.09 3.87 4.38	.056 .112 .078 .059 .056 .062	2.51 2.64 2.93 3.04 3.23 3.51 4.72 5.16	5.31 5.50 5.48 5.95	.15 .12 .11 .13 .12 .07 05	1.4963 .5391 .2750 .1348 .0936 .0599	.0249 .0502 .0348 .0265 .0249 .0277 .0362	.394 .414 .461 .478 .508 .552 .741	.833 .864 .862 .934	.023 .018 .017 .020 .018 .011 008
.40 .40 .40 .40 .40 .40	0 .63 1.06 1.48 2.11 2.53 3.17 3.59	0 .005 .038 .052 .075 .103 .188 .282	029 003 .042 .154 .429	0 .74 1.23 1.72 2.46 2.96 3.70 4.19	.046 .126 .088 .062 .059 .069	2.39 2.51 2.78 2.88 3.02 3.39 4.26 5.20	5.11 5.34 5.26 5.63	.05 .02 .01 .03 .02 04 16	1.9950 .7188 .3666 .1797 .1248 .0799	.0249 .0682 .0476 .0337 .0321 .0375	.414 .434 .481 .498 .522 .586 .737 .899	.884	.009 .004 .001 .006 .003 007 027
.50 .50 .50 .50 .50 .50	0 .63 1.06 1.48 2.11 2.53 3.17 3.59	0 .005 .049 .063 .087 .108 .221	013 .007 .072 .201 .556	0 .71 1.18 1.66 2.37 2.84 3.55 4.03	.040 .140 .092 .062 .054 .070		4.93 5.14 5.05 5.38	03 05 07 04 06 12 25 36	2.4938 .8985 .4583 .2246 .1560 .0999	.0879 .0577 .0390 .0337	.492 .502 .532 .593		005 010 013 008 011 023 047
							$\tau = 12^{\circ}$,				1	0.11
0 0 0 0 0 0 0 0 0	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	.001 .006 .016 .078	.008 .127 .328						0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 .0009 .0027 .0050 .0156 .0222	0.500 500 1.077 2.384 2.3.118	.404	0.11 .11 .11 .10 .09 .066 .04

TABLE V - Continued

^C △ _Q	c_{V_Q}	c_{R_Q}	C _{MQ}	$c_{V_{\triangle}}$	$^{\mathrm{C}}\mathrm{D}_{\!\Delta}$	$\frac{\mathbf{x}}{\left(\frac{\triangle}{\mathbf{w}}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$^{\mathrm{C}}_{\mathrm{L}_{\mathrm{Q}}}$	$^{\mathrm{C}}_{\mathrm{D}_{\mathrm{Q}}}$	<u>x</u>	<u>l</u>	h L
							o - Cone						
0.10 .10 .10 .10 .10 .10 .10 .10	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	.003 .012 .016 .033 .056 .125 .200	-0.091 078 062 056 029 .031 .248 .476	0 .93 1.55 2.17 3.10 3.72 4.65 5.26 6.19	0.070 .100 .068 .069 .081 .116 .144 .157	2.57 2.87 3.25 3.37 3.99 5.19 9.67 11.56 17.18	5.49 5.77 6.90 6.82	0.62 .59 .59 .60 .55 .46 .27 .11	0.4988 .1797 .0917 .0449 .0312 .0200 .0155	0.0150 .0215 .0147 .0148 .0175 .0249 .0311	0.279 .313 .354 .367 .434 .566 1.054 1.303 1.872	0.598 .629 .752 .744	0.067 .065 .065 .053 .060 .050 .029 .012
.20 .20 .20 .20 .20 .20 .20 .20	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .005 .021 .028 .049 .075 .153 .214	147 127 097 085 029 .067 .335 .556 1.030	0 .83 1.38 1.93 2.76 3.31 4.14 4.69 5.52	.073 .110 .075 .064 .068 .089 .097	2.33 2.53 2.82 2.92 3.39 4.17 6.16 7.61 10.45	4.99 5.19 5.25 5.87	.31 .28 .29 .31 .27 .20 .05 04	.9975 .3594 .1833 .0898 .0624 .0399 .0311	.0249 .0377 .0256 .0220 .0234 .0305 .0332	.320 .347 .387 .401 .465 .572 .845 1.044	.685 -713 -721 .805	.043 .040 .043 .037 .027 .006
.30 .30 .30 .30 .30 .30 .30	0 .63 1.06 1.48 2.11 2.53 3.17 3.59	0 .005 .035 .042 .066 .101 .183	184 159 107 100 025 .123 .413 .651	0 .77 1.29 1.80 2.58 3.09 3.87 4.38	.056 .140 .086 .066 .070 .081	2.23 2.36 2.64 2.68 3.04 3.75 5.04 6.00	4.79 5.02 5.07 5.48	.17 .13 .15 .17 .15 .06 04	1.4963 .5391 .2750 .1348 .0936 .0599	.0249 .0628 .0385 .0296 .0315 .0365 .0384	.350 .370 .414 .421 .478 .589 .791 .943	.752	.021 .021 .021 .021 .010
.40 .40 .40 .40 .40 .40 .40	0 .63 1.06 1.48 2.11 2.53 3.17 3.59	0 .008 .047 .056 .080 .122 .212	196 164 107 087 003 .159 .480 .878	0 1.23 1.72 2.46 2.96 3.70 4.19	.074 .155 .095 .066 .070 .078	2.20 2.32 2.51 2.59 2.88 3.41 4.38 5.53	4.69 4.90 4.90 5.24	.05 .02 .03 .03 .03 04 14 23	1.9950 .7188 .3666 .1797 .1248 .0799	.0399 .0843 .0513 .0359 .0380 .0423	.380 .401 .434 .448 .498 .589 .758	.811 .848 .848 .906	.009 .000 .000 .000 000
.50 .50 .50 .50 .50	0 .63 1.06 1.48 2.11 2.53 3.17 3.59	0 .009 .063 .075 .103 .143 .247 .343	186 151 092 067 .047 .229 .581	0 .71 1.18 1.66 2.37 2.84 3.55 4.03	.071 .179 .109 .073 .071 .078 .085	2.21 2.30 2.44 2.51 2.79 3.24 4.03 4.03	4.60 4.75 4.78	04 07 05 04 07 13 23 29	2.4938 .8985 .4583 .2246 .1560 .0999	.0449 .1130 .0687 .0462 .0446 .0493	.411 .428 .455 .468 .519 .603 .751 .872	.856	00 01 01 00 01 02 04 05
							τ = 160		,				
0 0 0 0 0 0 0 0 0 0 0 0	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	.002 .002 .026 .026 .103 .176	.018 .188 .409						0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 .0018 .0027 .0081 .0206 .0274 .0332	0.500 .500 1.104 2.047 2.492 2.889	0.275 .275 .337 .581	0.139 .139 .14 .14 .13 .11 .07
.10 .10 .10 .10 .10 .10 .10	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	.228	080 070 013 .058 .286	0 .93 1.55 2.17 3.10 3.72 4.65 5.26 6.19	.164	2.44 2.35 2.84 3.09 4.30 5.62 8.31 11.77 16.16		.72 .66 .71 .72 .62 .50 .28 .15	.4988 .1797 .0917 .0449 .0312 .0200 .0155 .0112	.0251 .0174 .0202 .0234 .0299	.337 .468 .613 .906 1.283	.528 .547 .584 .687	.07 .07 .07 .07 .06 .05 .03 .01

 $\begin{tabular}{llll} TABLE V - Continued \\ EXPERIMENTAL HYDRODYNAMIC DATA FOR A BODY OF REVOLUTION \\ \end{tabular}$

^C △Q	c_{V_Q}	$^{\mathrm{C}}\mathrm{R}_{\mathrm{Q}}$	c_{M_Q}	$c^{\Lambda^{\nabla}}$	$^{\text{C}}_{\text{D}_{\Delta}}$	$\frac{x}{\left(\frac{\triangle}{\overline{w}}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{\frac{h}{\left(\frac{\triangle}{\overline{w}}\right)^{1/3}}$	$^{\mathrm{C}}_{\mathrm{L}_{\mathrm{Q}}}$	$^{\mathrm{C}}\mathrm{D}_{\mathrm{Q}}$	<u>x</u>	<u>l</u>	<u>h</u> L
							o - Conc	luded					
0.20 .20 .20 .20 .20 .20 .20	0 .63 1.06 1.48 2.11 2.53 3.17 3.59	0 .006 .028 .038 .066 .103 .188 .268	-0.159 145 121 107 017 .097 .373 .655	0 .83 1.38 1.93 2.76 3.31 4.14 4.69	0.087 .147 .102 .087 .094 .110	2.21 2.35 2.60 2.72 3.48 4.39 5.72 6.30	4.52 4.70 4.93 5.58	0.37 .34 .37 .37 .29 .22 .07	0.9975 .3594 .1833 .0898 .0624 .0399	0.0299 .0502 .0348 .0298 .0321 .0375 .0416	0.303 .323 .357 .374 .478 .603 .785	.645 .645 .766	0.051 .046 .051 .051 .039 .030 .010
.30 .30 .30 .30 .30 .30 .30	0 .63 1.06 1.48 2.11 2.53 3.17 3.59	0 .011 .044 .053 .082 .125 .226 .301	196 174 144 123 004 .142 .464	0 .77 1.29 1.80 2.58 3.09 3.87 4.38	.123 .176 .108 .082 .087 .101	2.23 2.32 2.44 2.57 3.15 3.84 5.14 6.24	4.39 4.61 4.66 5.11	.19 .15 .18 .19 .12 .06 05 13	1.4963 .5391 .2750 .1348 .0936 .0599	.0549 .0789 .0485 .0368 .0390 .0451 .0467	.350 .364 .384 .404 .495 .603 .808	.690 .724 .732 .802	.029 .024 .028 .030 .018 .010 008
.40 .40 .40 .40 .40 .40 .40	0 .63 1.06 1.48 2.11 2.53 3.17 3.59	0 .011 .059 .068 .096 .153 .259	211 192 154 117 .007 .214 .567 .879	0 .74 1.23 1.72 2.46 2.96 3.70 4.19	.101 .195 .115 .079 .088 .095 .097	2.14 2.20 2.36 2.49 2.86 3.56 4.38 5.37	4.35 4.49 4.60 4.98	.05 .04 .06 .09 .03 04 15 23	1.9950 .7188 .3666 .1797 .1248 .0799	.0549 .1058 .0623 .0431 .0477 .0516	.370 .380 .407 .431 .495 .616 .758	.752	.008 .007 .011 .015 .006 007 026
.50 .50 .50 .50 .50 .50	0 .63 1.06 1.48 2.11 2.53 3.17 3.59	0 .020 .075 .085 .125 .174 .275	207 174 143 107 .082 .276 .672 1.000	0 .71 1.18 1.66 2.37 2.84 3.55 4.03	.158 .214 .124 .089 .086 .087	2.13 2.22 2.31 2.41 2.87 3.33 4.19 4.84	4.41 4.43 4.55 	05 07 03 01 08 13 20 27	2.4938 .8985 .4583 .2246 .1560 .0999	.0998 .1348 .0778 .0561 .0542 .0548	•397 •414 •431 •448 •535 •620 •781 •902	.820	010 013 005 002 015 023 038 050
							$\tau = 20^{\circ}$						
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .001 .002 .009 .038 .115 .195 .310	019 004 .017 .159 .373						0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		 -8.929 -4.215 .209 .815 1.448 1.818 2.229	.224	0.172 .178 .179 .173 .161 .134 .097 .078
.10 .10 .10 .10 .10 .10	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .006 .016 .021 .056 .094 .176 .251	103 087 013 .057 .275 .505	0 .93 1.55 2.17 3.10 3.72 4.65 5.26 6.19	0.139 .133 .089 .117 .136 .163 .181	2.01 2.16 2.35 2.72 4.33 5.56 8.44 10.63 13.72	4.43 4.51 4.95 5.90	0.85 .84 .86 .86 .58 .58 .39 .24	.4988 .1797 .0917 .0449 .0312 .0200 .0155 .0112	.0299 .0287 .0192 .0251 .0293 .0351 .0390	.256 .296 .471 .606 .919	.483 .491 .539 .643	.092 .091 .094 .076 .063 .043 .026

TABLE V - Concluded

EXPERIMENTAL HYDRODYNAMIC DATA FOR A BODY OF REVOLUTION

OF FINENESS RATIO 6 WITHOUT CHINE STRIPS

C _{AQ}	c _{VQ}	c _{RQ}	C _{MQ}	$c_{V_{\Delta}}$	$c_{\mathbb{D}_{\!$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	c_{L_Q}	C _{DQ}	X L	<u>l</u>	<u>h</u> L
							20° - Con						
0.20 .20 .20 .20 .20 .20 .20	0 .63 1.06 1.48 2.11 2.53 3.17 3.59	0 .009 .033 .040 .085 .127 .223 .296	-0.174 164 154 127 004 .097 .372 .637	0 .83 1.38 1.93 2.76 3.31 4.14 4.69	0.131 .173 .107 .111 .116 .130	2.03 2.16 2.30 2.55 3.61 4.34 6.03 7.41	4.19 4.33 4.56 5.23	0.43 .43 .47 .47 .35 .25 .12	0.9975 .3594 .1833 .0898 .0624 .0399 .0311	0.0449 .0592 .0366 .0381 .0396 .0445 .0460	0.279 .296 .316 .350 .495 .596 .828	0.575 .595 .626 .718	0.060 .059 .065 .065 .047 .035 .016
.30 .30 .30 .30 .30 .30 .30	0 .63 1.06 1.48 2.11 2.53 3.17 3.59	0 .014 .052 .061 .103 .157 .270	212 201 184 147 0 .145 .494 .779	0 .77 1.29 1.80 2.58 3.09 3.87 4.38	.156 .208 .125 .103 .109 .120	2.06 2.12 2.25 2.44 3.17 3.81 5.14 6.07	4.09 4.59 4.48 	.21 .18 .23 .23 .13 .05 05	1.4963 .5391 .2750 .1348 .0936 .0599	.0698 .0933 .0559 .0462 .0489 .0538	•323 •333 •354 •384 •500 •599 •808 •953	.643 .721 .704	.033 .029 .036 .036 .020 .008 008
.40 .40 .40 .40 .40 .40	0 .63 1.06 1.48 2.11 2.53 3.17 3.59	0 .016 .071 .082 .132 .190 .306 .393	232 217 201 139 .040 .219 .556 .879	0 .74 1.23 1.72 2.46 2.96 3.70 4.19	.147 .235 .138 .109 .109	2.05 2.11 2.20 2.42 3.02 3.56 4.46 5.22	4.06 4.17 4.35 4.61	.05 .02 .06 .06 03 07 16	1.9950 .7188 .3666 .1797 .1248 .0799	.0798 .1274 .0751 .0592 .0592 .0610	.354 .365 .380 .418 .522 .616 .771 .902	.702	.009 .004 .010 .010 004 013 027 038
.50 .50 .50 .50 .50	0 1.06 1.48 2.11 2.53 3.17	0 .024 .094 .103 .157 .219 .334	226 211 191 118 .092 .275 .667	0 .71 1.18 1.66 2.37 2.84 3.55	.190 .268 .150 .112 .108	2.06 2.12 2.19 2.38 2.89 3.31 4.12	4.08 4.16 4.32	07 09 03 03 10 14 22	2.4938 .8985 .4583 .2246 .1560	.1197 .1686 .0943 .0705 .0683	.384 .394 .407 .444 .539 .616 .768	.760 .775	015 016 005 005 019 026 042

TABLE VI

EXPERIMENTAL HYDRODYNAMIC DATA FOR A BODY OF REVOLUTION

OF FINENESS RATIO 9 WITHOUT CHINE STRIPS

C _{AQ}	$^{\text{C}}_{\text{V}_{\text{Q}}}$	c_{R_Q}	C _{MQ}	$C^{\Lambda^{\nabla}}$	$c_{\mathbb{D}_{\Delta}}$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$^{\mathrm{C}}_{\mathrm{L}_{\mathrm{Q}}}$	$^{\mathrm{C}}_{\mathrm{D}_{\mathrm{Q}}}$	Ţ	<u>l</u>	h L
				-		1	$r = 0^{\circ}$						
0 0 0 0 0	0 .63 1.06 1.48 2.11	0 0 .002 .004 .009	.001 .007 .007 .013						0 0 0	.0036 .0037 .0040		.491 .598	0.058 .057 .056 .057 .056
0 0 0 0 0	2.53 3.17 3.59 4.22 4.64	.014 .035 .054 .105	.012 .024 .054 .108 .276						0 0 0 0 0	.0044 .0070 .0084 .0118		.748	.054 .053 .046 .044 .027
.10 .10 .10	0 .63 1.06 1.48 2.11	0 .001 .007 .011	.024 .029 .066 .070	0 .93 1.55 2.17 3.10	0.023 .059 .047 .048	6.55 6.64 7.45 7.54 7.97	8.96 9.86 9.48	0.40 .38 .36 .36	.4988 .1797 .0917 .0449	.0050 .0126 .0101 .0103	0.544 .551 .618 .626 .662	.744 .818 .786	.033 .031 .030 .030
.10 .10 .10	2.53 3.17 3.59 4.22 4.64	.032 .077 .111 .210	.092 .129 .155 .276	3.72 4.65 5.26 6.19 6.81	.046 .072 .080 .110	8.03 8.81 9.36 11.93 11.43	11.80	.35 .31 .27 .16	.0312 .0200 .0155 .0112 .0093	.0100 .0154 .0172 .0236 .0240	.667 .731 .777 .990 .949	.979	.029 .026 .022 .013
.20 .20 .20 .20 .20 .20 .20	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .002 .009 .018 .037 .053 .098 .180	.050 .050 .102 .134 .170 .176 .202 .255	0 .83 1.38 1.93 2.76 3.31 4.14 4.69 5.52	.029 .047 .048 .049 .048 .057 .082	5.20 5.20 5.66 5.94 6.23 6.28 6.50 6.97	9.06	.23 .21 .19 .19 .19 .18 .14 .08	0 .9975 .3594 .1833 .0898 .0624 .0399 .0311 .0225	.0100 .0161 .0165 .0166 .0165 .0195	.544 .544 .592 .621 .651 .656 .679 .728	.848	.024 .022 .020 .020 .020 .019 .015
.30 .30 .30 .30 .30 .30	.63 1.06 1.48 2.11 2.53 3.17	.075		0 .77 1.29 1.80 2.58 3.09 3.87 4.38	.022 .060 .047 .051 .052 .061	4.55 4.55 4.95 5.12 5.42 5.42 5.32 5.62	7.73 8.36 8.36	.12 .12 .08 .09 .08 .07 .03	1.4963 .5391 .2750 .1348 .0936 .0599	.0100 .0269 .0211 .0229 .0234 .0275	.544 .544 .592 .613 .649 .631 .636		.014 .014 .010 .010 .009 .008
.40 .40 .40 .40	.63 1.05 1.48 2.11 2.53	.002	.197 .216 .249	0 .74 1.23 1.72 2.46 2.96 3.70	.037 .007 .056 .053 .057	4.09 4.07 4.46 4.53 4.66 4.59 4.50	7.59	02	1.9950 .7188 .3666 .1797 .1248	.0036 .0302 .0288 .0312	.587 .597 .613	1.000	00
•50 •50 •50 •50 •50 •50	1.48 0 2.11 0 2.53	.025 .042 .07 .121	.192 .238 .255 .213	2.37	.071 .061 .055	4.11	7.05	01 05 05 06	2.4938 .8985 .4583 .2246 .1560	.0449 .0385 .0346	.536 .569 .585	1.000	00 00 00 01

 $\begin{tabular}{ll} \begin{tabular}{ll} TABLE VI - Continued \\ \end{tabular} \begin{tabular}{ll} EXPERIMENTAL HYDRODYNAMIC DATA FOR A BODY OF REVOLUTION \\ \end{tabular} \label{table}$

C _{AQ}	$^{\text{C}}_{\text{V}_{\text{Q}}}$	C _{RQ}	C _{MQ}	$c_{V_{\Delta}}$	$c^{D^{\nabla}}$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$^{\rm C}_{\rm L_Q}$	c_{D_Q}	T	<u>l</u>	<u>h</u> L
THE STATE OF							$\tau = 4^{\circ}$						
0 0 0 0	0 .63 1.06 1.48 2.11	.001 .002 .008	0 0 0 0						0 0 0 0	0 .0018 .0018 .0036	0.500 .500 3.320	0.370 -449 -534	0.063 .062 .063 .062
0 0 0 0 0 0 0	2.53 3.17 3.59 4.22 4.64 5.28	.013 .029 .048 .098 .159 .262	.012 .024 .040 .097 .216 .476						0 0 0 0 0 0 0	.0041 .0058 .0075 .0110 .0148 .0188	2.808 2.808 2.697 2.979 3.951 5.169	.754	.057 .055 .050 .044 .037
.10 .10 .10 .10	0 .63 1.06 1.48 2.11 2.53	0 .002 .006 .011 .021 .033	064 .060 031 017 003 .007	93 1.55 2.17 3.10 3.72	0.046 .050 .047 .043 .048	4.67 4.73 5.38 5.65 5.96 6.18	9.07 9.09 8.91	0.40 .40 .37 .37 .37	0.4988 .1797 .0917 .0449 .0312	.0100 .0108 .0101 .0094 .0103	.387 .392 .446 .469 .495 .513	.752 .754 .739	.033 .033 .031 .031
.10 .10 .10	3.17 3.59 4.22 4.64 5.28	.055 .086 .154 .212	.028 .067 .196 .328 .618	4.65 5.26 6.19 6.81 7.74	.051 .062 .080 .091 .107	6.61 7.39 9.86 12.21 16.93	9.40	.31 .30 .21 .16	.0200 .0155 .0112 .0093 .0072	.0110 .0134 .0173 .0197 .0230	.549 .613 .818 1.013 1.405	.780	.025 .015 .013
.20 .20 .20 .20	0 .63 1.06 1.48 2.11 2.53	0 .002 .009 .016 .030 .047	111 100 052 020 .007 .003	0 .83 1.38 1.93 2.76 3.31	.029 .047 .043 .040 .043	3.83 3.92 4.34 4.61 4.86 4.81	7.91 8.08 7.89	.22 .22 .20 .20 .20	.9975 .3594 .1833 .0898 .0624	.0100 .0161 .0147 .0135 .0147	.400 .410 .454 .482 .508	.827 .844 .825	.023 .023 .021 .021
.20 .20 .20 .20	3.17 3.59 4.22 4.64 5.28	.079 .121 .198 .257 .343	.066 .122 .269 .429	4.14 4.69 5.52 6.07 6.90	.046 .055 .065 .070	5.35 5.79 6.95 8.14	8.14	.16 .14 .09 .04	.0399 .0311 .0225 .0186 .0144	.0158 .0188 .0222 .0238 .0246	.559 .605 .726 .851	.850	.015 .016 .000 013
.30 .30 .30 .30 .30	0 .63 1.06 1.48 2.11 2.53	0 .002 .012 .023 .043 .062	133 111 046 008 .034 .054	0 .77 1.29 1.80 2.58 3.09	.022 .048 .047 .043 .043	3.62 3.62 3.95 4.14 4.36 4.44	7.36 7.50 7.43	.11 .10 .08 .09 .09	1.4963 .5391 .2750 .1348	.0100 .0215 .0211 .0193 .0193	.433 .433 .472 .495 .521 .531	.880	.013 .011 .009 .011
.30 .30 .30 .30	3.17 3.59 4.22 4.64 5.28	.102 .147 .231 .326 .473	.102 .159 .344 .629	3.87 4.38 5.16 5.67 6.45	.045 .051 .058 .067	4.67 4.95 5.81 7.10 8.69	7.50 8.11	.06 .05 01 10 18	.0599 .0466 .0337 .0278 .0216	.0203 .0228 .0259 .0302 .0340	.559 .592 .695 .849	.897	.000 .006 001 012
.40 .40 .40 .40	0 .63 1.06 1.48 2.11	0 .004 .019 .032 .056	135 115 031 .012 .060	0 .74 1.23 1.72 2.46	.037 .063 .054 .046	3.33 3.41 3.70 3.83 3.99	7.12 7.04	.04 .03 .01 .03 .03	1.9950 .7188 .3666 .1797	.0200 .0341 .0293 .0252	.438 .449 .487 .505 .526	.919	.005
.40 .40 .40 .40	2.53 3.17 3.59 4.22 4.64	.079 .132 .183 .300 .410	.087 .149 .222 .524 .730	2.96 3.70 4.19 4.93 5.42	.045 .049 .052 .062 .070	4.09 4.28 4.53 5.49 6.11	7.14	.01 01 02 11 15	.1248 .0799 .0622 .0449 .0371	.0246 .0264 .0284 .0337 .0381	.538 .564 .597 .723 .805	.940	000 000 015 020

TABLE VI - Continued

EXPERIMENTAL HYDRODYNAMIC DATA FOR A BODY OF REVOLUTION

OF FINENESS RATIO 9 WITHOUT CHINE STRIPS

$^{\mathrm{C}}_{\Delta_{\mathrm{Q}}}$	$^{\mathrm{C}}\mathrm{v}_{\mathrm{Q}}$	c_{R_Q}	C _{MQ}	$c^{\Lambda^{\nabla}}$	$^{\mathrm{C}_{\mathrm{D}_{\! \triangle}}}$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$^{\mathrm{C}}_{\mathrm{L}_{\mathrm{Q}}}$	$^{\mathrm{C}}_{\mathrm{D}_{\mathrm{Q}}}$	<u>x</u>	L	<u>h</u> L
						τ = 4°	- Concl	uded					
0.50 .50 .50 .50 .50 .50 .50	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .004 .022 .040 .065 .092 .142 .224	-0.115 100 013 .034 .081 .113 .197 .344 .561	0 .71 1.18 1.66 2.37 2.84 3.55 4.03 4.74	0.032 .063 .058 .046 .046 .045 .055	3.24 3.27 3.49 3.62 3.72 3.81 4.01 4.38 4.88	6.75 6.85 6.75 	-0.02 03 05 04 04 04 07 12	2.4938 .8985 .4583 .2246 .1560 .0999 .0777 .0562	0.0200 .0395 .0367 .0292 .0287 .0284 .0348	0.459 .464 .495 .513 .528 .541 .569 .621	.972 .972 .957 .979	-0.003 004 007 005 005 009 016 020
							$\tau = 8^{\circ}$						
0 0 0 0 0 0 0	0 .63 1.06 1.48 2.11 2.53	.001 .001 .002 .006 .008	0 .007 003 .003 003						0 0 0 0	0.0050 .0018 .0018 .0027 .0025	8.559 -3.164 1.987 254 .928	0.459 .419 .408	0.075 .075 .076 .075 .076
0 0 0 0	3.17 3.59 4.22 4.64 5.28	.029 .049 .114 .175 .263	0 .040 .186 .350 .750						0 0 0 0 0	.0058 .0076 .0128 .0162 .0189	.500 1.487 2.590 3.064 4.143	.466	.066 .061 .050 .033 .026
.10 .10 .10 .10	0 .63 1.06 1.48 2.11 2.53	.004 .007 .014 .023 .036	132 115 094 094 083 062	0 .93 1.55 2.17 3.10 3.72	0.093 .059 .059 .048 .052	3.15 3.52 3.99 4.02 4.26 4.73	7.34 7.16 7.16	0.52 .51 .51 .52 .52	.4988 .1797 .0917 .0449	.0200 .0126 .0128 .0103 .0112	.262 .292 .331 .333 .354 .392	.609 .594 .594	.043 .042 .042 .043 .043
.10 .10 .10 .10	3.17 3.59 4.22 4.64 5.28	.068 .107 .168 .228	.019 .119 .344 .560	4.65 5.26 6.19 6.81 7.74	.063 .077 .087 .098	6.40 8.28 12.08 15.20 12.21	7.78 8.58	.42 .35 .23 .13	.0200 .0155 .0112 .0093 .0072	.0136 .0166 .0188 .0211 .0208	.531 .687 1.003 1.262 1.013	.645	.035 .029 .019 .011
.20 .20 .20 .20 .20	0 .63 1.06 1.48 2.11 2.53	0 .001 .012 .020 .035 .049	195 175 141 127 115 073	0 .83 1.38 1.93 2.76 3.31	.015 .063 .054 .046	3.09 3.09 3.58 3.70 3.80 4.17	6.73	.28 .26 .26 .28 .28	.9975 .3594 .1833 .0898	.0050 .0215 .0183 .0157 .0153	•323 •323 •374 •387 •397 •436	.703 .699 .679	.029 .027 .027 .029 .029
.20 .20 .20 .20	3.17 3.59 4.22 4.64 5.28	.089 .124 .194 .237 .322	.034 .139 .423 .623	4.14 4.69 5.52 6.07 6.90	.052 .056 .064 .064	5.05 5.88 8.00 9.42	6.91 7.61	.22 .16 .08 .02	.0399 .0311 .0225 .0186 .0144	.0177 .0193 .0218 .0220 .0231	.528 .615 .836 .985	.722	.023 .017 .009 .002 005
.30 .30 .30 .30 .30	0 .63 1.06 1.48 2.11 2.53	0 .005 .023 .033 .051 .065	241 216 169 147 111 082	0 .77 1.29 1.80 2.58 3.09	.056 .092 .067 .051 .045	2.98 3.08 3.34 3.45 3.64 3.77	6.36 6.36 6.25	.14 .13 .13 .15 .14	1.4963 .5391 .2750 .1348 .0936	.0249 .0413 .0302 .0229	.356 .369 .400 .413 .436 .451	.761	.017 .016 .015 .018 .017
.30 .30 .30 .30 .30	3.17 3.59 4.22 4.64 5.28	.103 .147 .222 .263 .338	.060 .228 .544 .764	3.87 4.38 5.16 5.67 6.45	.046 .051 .056 .054 .054	4.46 5.25 6.66 7.61	6.57	.08 .05 01 05 10	.0599 .0466 .0337 .0278 .0216	.0205 .0228 .0249 .0244 .0243	•533 •628 •797 •910	.786	.010 .005 001 005 012

TABLE VI - Continued

EXPERIMENTAL HYDRODYNAMIC DATA FOR A BODY OF REVOLUTION

C _{AQ}	CVQ	C _{RQ}	C _{MQ}	$c^{\Lambda^{\nabla}}$	$c_{D_{\Delta}}$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$^{\mathrm{C}}_{\mathrm{L}_{\mathrm{Q}}}$	$^{\mathrm{C}}_{\mathrm{D}_{\mathrm{Q}}}$	<u>x</u> L	<u>L</u>	<u>h</u> L
						$\tau = 8^{\circ}$	- Concl						
0.40 .40 .40 .40 .40	0 .63 1.06 1.48 2.11	0 .006 .028 .042 .063	-0.254 234 180 149 106	0 .74 1.23 1.72 2.46	0.055 .093 .071 .052	2.92 3.00 3.20 3.29 3.45	6.17 6.26 6.10	0.04 .04 .04 .05 .06	1.9950 .7188 .3666 .1797	0.0299 .0503 .0385 .0283	0:385 •395 •421 •433 •454	.825	0.006 .005 .005 .007 .008
.40 .40 .40 .40	2.53 3.17 3.59 4.22 4.64	.082 .126 .181 .255 .327	052 .129 .328 .628	2.96 3.70 4.19 4.93 5.42	.047 .046 .052 .053 .056	3.62 4.22 4.84 5.79	6.34	.05 0 04 09 14	.1248 .0799 .0622 .0449 .0371	.0256 .0252 .0281 .0286 .0304	.477 .556 .638 .762	.835	.006 .001 005 012 018
.50 .50 .50 .50 .50 .50 .50	0 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .006 .037 .051 .079 .105 .149 .218	244 228 159 133 067 0 .201 .436 .624	0 .71 1.18 1.66 2.37 2.84 3.55 4.03 4.74	.048 .106 .074 .056 .052 .047 .054	2.91 2.95 3.13 3.18 3.36 3.52 4.01 4.55 5.03	6.04	04 04 03 02 04 06 13 13	2.4938 .8985 .4583 .2246 .1560 .0999 .0777 .0562	.0299 .0665 .0467 .0355 .0328 .0297 .0339	.413 .418 .444 .451 .477 .500 .569 .646 .713	.857 .872 .857 .889	005 006 005 004 003 006 008 018 019
							$\tau = 12^{\circ}$						
0 0 0 0 0 0 0	0 1.06 1.48 2.11 2.53	0 0 .001 .001 .004 .008	0 0 008 003 008 002	===			===	===	0 0 0 0 0 0	0 .0018 .0009 .0018 .0025	-2.577 782 -1.038 .308	.220	0.105 .103 .104 .104 .100 .098
0 0 0 0	3.17 3.59 4.22 4.64 5.28	.021 .089 .134 .176	.012 .114 .259 .407 .698	===			===	===	0 0 0 0 0	.0042 .0138 .0150 .0163 .0168	1.013 1.590 2.154 2.497 3.069	.380	.093 .071 .061 .054 .060
.10 .10 .10 .10	0 1.06 1.48 2.11 2.53	0 .004 .011 .015 .027 .043	147 140 132 121 100 054	0 .93 1.55 2.17 3.10 3.72	0.093 .091 .064 .056 .062	0.28 2.97 3.18 3.46 3.96 4.94	6.21	0.68 .64 .66 .70 .68	.4988 .1797 .0917 .0449	.0200 .0197 .0137 .0121 .0134	.231 .246 .264 .287 .328 .410	.515	.056 .053 .055 .058 .056
.10 .10 .10 .10	3.17 3.59 4.22 4.65 5.28	.078 .117 .166 .205 .281	.039 .139 .349 .549	4.65 5.26 6.19 6.81 7.74	.072 .085 .086 .088	6.77 8.47 11.74 14.43 19.31	7.00	•53 •44 •36 •29 •15	.0200 .0155 .0112 .0093 .0072	.0156 .0182 .0186 .0190 .0202	.562 .703 .974 1.197 1.603	.581	.044 .037 .030 .024 .012
.20 .20 .20 .20 .20	0 1.06 1.48 2.11 2.53	0 .006 .020 .027 .042 .063	233 217 196 191 147 079	0 .83 1.38 1.93 2.76 3.31	.087 .105 .072 .055 .057	2.75 2.90 3.12 3.17 3.56 4.14	5.77 5.91 5.79	•35 •33 •35 •37 •35 •31	.9975 .3594 .1833 .0898 .0624	.0299 .0359 .0247 .0189 .0196	.287 .303 .326 .331 .372 .433	.603	.037 .035 .037 .039 .037 .033
.20 .20 .20 .20	3.17 3.59 4.22 4.64 5.28	.107 .144 .203 .246 .319	.063 .213 .508 .719 1.119	4.14 4.69 5.52 6.07 6.90	.062 .066 .067 .067	5.27 6.40 8.44 9.77 12.07	6.54	.24 .20 .13 .08	.0399 .0311 .0225 .0186 .0144	.0213 .0224 .0228 .0228 .0229	.551 .669 .882 1.021 1.262	.707	.026 .021 .013 .008

 $\begin{tabular}{ll} \begin{tabular}{ll} \be$

$^{\mathrm{C}}\!\Delta_{\!\mathrm{Q}}$	c_{V_Q}	C_{R_Q}	$^{\mathrm{C}}_{\mathrm{M}_{\mathrm{Q}}}$	$c^{\Lambda^{\nabla}}$	$^{\mathrm{C}}_{\mathrm{D}_{\!\Delta}}$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	c_{L_Q}	C _{DQ}	X L	<u>l</u>	<u>h</u> L
			,	•	•		o - Conc						
0.30 .30 .30 .30	0 .63 1.06 1.48 2.11	0 .005 .028 .037 .056	-0.283 267 239 222 164	0 •77 1.29 1.80 2.58	0.056 .112 .076 .056	2.74 2.83 2.98 3.08 3.37	5.64 5.73 5.61	0.17 .15 .17 .21	1.4963 .5391 .2750 .1348	0.0249 .0502 .0339 .0251	0.328 .338 .356 .369 .403	.686	0.020 .018 .020 .025 .024
.30 .30 .30 .30	2.53 3.17 3.59 4.22 4.64	.079 .132 .183 .248	073 .113 .318 .647 .847	3.09 3.87 4.38 5.16 5.67	.055 .059 .063 .062 .060	3.84 4.70 5.62 6.99 7.76	6.07	.14 .10 .05 02 05	.0936 .0599 .0466 .0337 .0278	.0246 .0263 .0284 .0278 .0267	.459 .562 .672 .836 .928	.726	.017 .012 .006 002 006
.40 .40 .40 .40	0 .63 1.06 1.48 2.11	0 .008 .037 .051 .075	302 281 .255 235 154	0 .74 1.23 1.72 2.46	.074 .123 .086	2.75 2.82 2.94 3.00 3.29	5.57 5.68 5.58	.04 .03 .05 .08	1.9950 .7188 .3666 .1797	.0399 .0665 .0467 .0337	.362 .372 .387 .395 .433	.733 .748 .735	.006 .004 .007 .010
.40 .40 .40 .40	2.53 3.17 3.59 4.22 4.64	.097 .162 .210 .290 .360	052 .179 .370 .730 1.032	2.96 3.70 4.19 4.93 5.42	.056 .060 .060 .060	3.62 4.36 4.94 6.00 6.88	5.94	.04 02 05 09 14	.1248 .0799 .0622 .0449 .0371	.0303 .0323 .0326 .0326 .0334	.477 .574 .651 .790 .895	.782	.005 002 007 012 019
•50 •50 •50 •50 •50 •50 •50 •50	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .009 .049 .063 .092 .121 .191 .255 .333	297 275 249 228 133 004 .249 .486 .843	0 .71 1.18 1.66 2.37 2.84 3.55 4.03 4.74	.071 .140 .092 .066 .060 .061 .063	2.76 2.82 2.89 2.95 3.20 3.50 4.12 4.65 5.42	5.54 5.60 5.54 5.81	06 07 04 01 02 04 11 05 15	2.4938 .8985 .4583 .2246 .1560 .0999 .0777	.0449 .0881 .0577 .0413 .0377 .0381 .0396	.392 .400 .410 .418 .454 .497 .585 .659 .769	.786 .795 .786 .825	008 009 006 002 003 006 014 007 019
							$\tau = 16^{\circ}$,	,	,	
0 0 0 0 0 0 0	0 .63 1.06 1.48 2.11 2.53	0 .002 .005 .008 .014 .025	035						0 0 0 0 0	0.0100 .0090 .0037 .0063 .0078	-3.164 -3.943 964 462 .262	0.252 .179 .239 .365	0.129 .124 .129 .125 .125 .116
0 0 0 0 0	3.17 3.59 4.22 4.64 5.28	.092	.117 .296 .444						0 0 0 0	.0114 .0143 .0180 .0197 .0206	1.331	.504	.108 .098 .085 .075 .066
.10 .10 .10 .10	0 .63 1.06 1.48 2.11 2.53	.016	158 133 088		.133 .072 .075	2.41 2.63 2.66 3.18 4.23 5.25	5.46 5.56 5.69	0.83 .78 .84 .86 .81	.4988 .1797 .0917 .0449	.0249 .0287 .0156 .0162	.221 .264 .351	.453	.069 .065 .070 .071 .067
.10 .10 .10	3.17 3.59 4.22 4.64 5.28	.148	.191 .455 .638	6.19	.107	7.23 9.02 12.17 14.12 17.24	6.44 7.24	.63 .54 .42 .36	.0200 .0155 .0112 .0093 .0072	.0211 .0230 .0249 .0249	.749 1.010 1.172	.600	.052 .045 .035 .030 .022

TABLE VI - Continued

C _{AQ}	c_{V_Q}	$^{\mathrm{C}}\mathrm{R}_{\mathrm{Q}}$	C _{MQ}	$c^{\Lambda^{\nabla}}$	$^{\mathrm{C}_{\mathrm{D}_{\!\triangle}}}$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$^{\mathrm{C}}\mathrm{L}_{\mathrm{Q}}$	$^{\mathrm{C}}_{\mathrm{D}_{\mathrm{Q}}}$	<u>x</u>	L L	<u>h</u> L
	Hade						o - Conc						
0.20 .20 .20 .20	0 .63 1.06 1.48 2.11	0 .006 .027 .032 .057	-0.251 233 238 207 137	0 .83 1.38 1.93 2.76	0.087 .142 .086 .075	2.55 2.73 2.75 3.01 3.65	5.23 5.28 5.34	0.44 .41 .47 .49 .46	0.9975 .3594 .1833 .0898	0.0299 .0484 .0293 .0256	0.267 .285 .287 .315 .382	•551 •558	0.046 .043 .049 .051
.20 .20 .20 .20	2.53 3.17 3.59 4.22 4.64	.083 .144 .190 .257 .307	040 .117 .271 .536 .785	3.31 4.14 4.69 5.52 6.07	.076 .084 .086 .084	4.47 5.65 6.67 8.27 9.64	5.77	•39 •32 •27 •20 •17	.0624 .0399 .0311 .0225 .0186	.0259 .0287 .0295 .0288 .0285	.467 .590 .697 .864 1.008	.603	.04: .03: .02: .02:
.30 .30 .30 .30 .30 .30 .30	0 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .009 .041 .062 .075 .106 .169 .222 .300	302 281 282 255 141 040 .144 .323	0 .77 1.29 1.80 2.58 3.09 3.87 4.38 5.16	.100 .164 .127 .075 .074 .075 .077	2.62 2.72 2.77 2.93 3.49 3.99 4.82 5.55 7.29	5.16 5.22 5.32 5.64	.23 .23 .27 .29 .24 .18 .15 .11	1.4963 .5391 .2750 .1348 .0936 .0599 .0466	.0449 .0735 .0568 .0337 .0330 .0337 .0345	.313 .326 .331 .351 .418 .477 .577 .664	.617 .624 .637	.02' .03' .03' .03' .02' .02' .02' .02'
.40 .40 .40 .40 .40 .40 .40	0 .63 1.06 1.48 2.11 2.53 3.17 3.59	0 .011 .053 .062 .089 .131 .209 .260	329 302 310 269 158 .020 .201	0 .74 1.23 1.72 2.46 2.96 3.70 4.19	.101 .175 .105 .074 .075 .077	2.63 2.75 2.75 2.88 3.27 3.86 4.42 4.98	5.16 5.16 5.19 5.40	.07 .07 .11 .11 .10 .06 .01	1.9950 .7188 .3666 .1797 .1248 .0799	.0549 .0952 .0568 .0400 .0409 .0417	.346 .362 .362 .379 .431 .508 .582	.679 .679 .684	.000 .000 .010 .010 .000 .000
.50 .50 .50 .50 .50 .50	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .014 .065 .078 .108 .155 .243 .304 .374	314 302 299 261 101 .054 .288 .539	0 .71 1.18 1.66 2.37 2.84 3.55 4.03 4.74	.111 .185 .114 .077 .077 .077 .075	2.69 2.75 2.76 2.88 3.27 3.65 4.19 4.74 5.49	5.17 5.15 5.21 5.24	06 05 0 .03 03 05 09 12 13	2.4938 .8985 .4583 .2246 .1560 .0999 .0777 .0562	.0698 .1168 .0715 .0485 .0484 .0485 .0473 .0420	.382 .390 .392 .408 .464 .518 .595 .672 .779	.733 .731 .739 .744	00 00 0 00 00 01 01
							$\tau = 20^{\circ}$						
0 0 0 0 0 0 0	0 1.06 1.48 2.11 2.53	0 .001 .002 .004 .007	0 010 010 010 007 002				===		0 0 0 0 0	.0050 .0036 .0037 .0031 .0044	-3.346 -1.423 782 013 .423	.229	0.17 .17 .17 .17 .17
0 0 0 0 0	3.16 3.59 4.22 4.64 5.28	.027 .062 .050 .160 .226	.007 .050 .007 .208						0 0 0 0 0	.0054 .0096 .0056 .0149 .0162	.641 .928 .577 1.179 1.354	.316	.16 .15 .15 .12
.10 .10 .10 .10	0 .63 1.06 1.48 2.11 2.53	0 .007 .018 .023 .044 .067	157 153 162 147 086 048	0 .93 1.55 2.17 3.10 3.72	0.162 .150 .098 .091	2.38 2.60 2.53 2.90 4.33 5.16	4.74 5.07 5.36	0.97 .99 .99 .99 .93 .90	.4988 .1797 .0917 .0449	.0349 .0323 .0211 .0197 .0209	.191 .215 .210 .241 .359 .428	·393 ·421 ·444	.08 .08 .08 .08

TABLE VI - Concluded

EXPERIMENTAL HYDRODYNAMIC DATA FOR A BODY OF REVOLUTION

OF FINENESS RATIO 9 WITHOUT CHINE STRIPS

^C △Q	c_{V_Q}	c_{R_Q}	$^{\mathrm{C}}_{\mathrm{M}_{\mathrm{Q}}}$	$c_{V_{\Delta}}$	$c_{D_{\Delta}}$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{\overline{w}}\right)^{1/3}}$	$\frac{\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$^{\mathrm{C}}\mathrm{L}_{\mathrm{Q}}$	$^{\mathrm{C}}_{\mathrm{D}_{\mathrm{Q}}}$	<u>x</u> L	<u>l</u> L	<u>h</u> L
					·	τ = 20	o - Conc	luded					
0.10 .10 .10 .10	3.17 3.59 4.22 4.64 5.28	0.117 .153 .215 .256 .321	0.049 .131 .313 .450 .633	4.65 5.26 6.19 6.81 7.74	0.108 .111 .112 .110 .107	6.83 7.94 10.04 11.37 12.73	5.77	0.78 .73 .65 .59	0.0200 .0155 .0112 .0093 .0072	0.0233 .0238 .0241 .0237 .0230	0.567 .659 .833 .944 1.056	0.479	0.065 .060 .054 .049 .048
.20 .20 .20 .20	0 1.06 1.48 2.11 2.53	0 .014 .034 .042 .070	243 255 255 232 136 073	0 .83 1.38 1.93 2.76 3.31	.204 .178 .113 .092	2.55 2.53 2.60 2.82 3.68 4.22	4.78 4.91 5.03	.50 .49 .54 .54 .49	.9975 .3594 .1833 .0898 .0624	.0698 .0610 .0385 .0314 .0309	.267 .264 .272 .295 .385 .441	.500	.052 .051 .056 .056 .051
.20 .20 .20 .20	3.17 3.59 4.22 4.64 5.28	.165 .204 .273 .314 .379	.070 .196 .423 .540	4.14 4.69 5.52 6.07 6.90	.096 .093 .090 .085	5.27 6.09 7.36 7.90 8.83	5.36	.38 .36 .32 .33	.0399 .0311 .0225 .0186 .0144	.0329 .0317 .0306 .0291 .0272	.551 .636 .769 .826	.560	.039 .038 .033 .034 .034
.30 .30 .30 .30	0 .63 1.06 1.48 2.11 2.53	0 .018 .050 .058 .092 .134	309 309 314 276 156 057	0 .77 1.29 1.80 2.58 3.09	.200 .200 .119 .096	2.53 2.57 2.62 2.81 3.43 3.92	4.75 4.80 4.93	.25 .25 .30 .32 .26	1.4963 .5391 .2750 .1348 .0936	.0898 .0897 .0531 .0431 .0418	.303 .308 .313 .336 .410 .469	.568 .575	.030 .030 .036 .038 .031
.30 .30 .30 .30	3.17 3.59 4.22 4.64 5.28	.209 .259 .330 .375 .452	.118 .276 .529 .699 .961	3.87 4.38 5.16 5.67 6.45	.093 .090 .083 .078 .073	4.67 5.29 6.17 6.73 7.48	5.13	.19 .17 .15 .15	.0599 .0466 .0337 .0278 .0216	.0417 .0402 .0370 .0348 .0325	•559 •633 •738 •805 •895	.613	.022 .020 .018 .018
.40 .40 .40 .40	0 .63 1.06 1.48 2.11	0 .018 .065 .074 .113	350 294	0 •74 1.23 1.72 2.46	.165 .215 .125 .094	2.57 2.59 2.61 2.80 3.31	4.92 4.70 4.95	.07 .09 .14 .15	1.9951 .7188 .3666 .1797	.0898 .1168 .0678		.620	.010 .012 .018 .020
.40 .40 .40 .40	2.53 3.17 3.59 4.22 4.64	.295	.654	2.96 3.70 4.19 4.93 5.42	.092 .090 .085 .076	3.93 4.28 4.79 5.57 6.01	5.05	.09 .07 .06 .05	.1248 .0799 .0622 .0449	.0499 .0489 .0459 .0413 .0384	.564 .631 .733	.664	.012 .009 .008
.50 .50 .50 .50 .50 .50 .50		.081 .092 .137 .186 .279	346 276 112 014 .213 .417	0 .71 1.18 1.66 2.37 2.84 3.55 4.03 4.74	.231 .134 .098 .092 .088	2.66 2.84 3.26 3.49 4.00 4.43	4.78 4.90 4.87 4.99	09 09 09 0 04 04 06	2.4938 .8985 .4583 .2246 .1560 .0999 .0777	.1456 .0843 .0615 .0580 .0557	.377 .403 .462 .495 .567		013 012 012 001 005 005 008

TABLE VII

EXPERIMENTAL HYDRODYNAMIC DATA FOR A BODY OF REVOLUTION OF
FINENESS RATIO 12 WITHOUT CHINE STRIPS

h $\left(\frac{\triangle}{\mathbf{w}}\right)^{1/3}$ c_{L_Q} c_{D_Q} c_{V_Q} c_{M_Q} $\left(\frac{\triangle}{\overline{w}}\right)^{1/3}$ c_{R_Q} X L L h L $c_{\Delta_{\!Q}}$ $\left(\frac{\triangle}{w}\right)^{1/3}$ $\tau = 0^{\circ}$ 0.415 0.042 0 0 0 0 0 .042 0 ----.63 0 0 .410 .042 0 0 ----1.06 0 ---------0 .0018 .042 0 ---------1.48 .002 0 ____ 0 .0027 .578 .040 --------2.11 .006 -003 ----0 .0031 .037 0 2.53 .010 .007 .0048 .689 .036 0 -----0 3.17 .024 .016 .0062 -----.036 3.59 ____ --------0 0 .040 .027 ----.825 .033 ----.0074 ----0 4.22 .066 .058 0 .0085 .031 --------0 4.64 .092 .087 ----____ ----0 0 .0139 .026 ----5.28 .193 .180 .749 .026 7.64 10.92 0.38 0.523 0 .015 .10 0 0 .532 .024 .63 .93 0.046 7.76 .36 .4988 .0100 -002 .10 .021 .863 .023 .576 .052 1.55 .050 8.40 12.59 .34 .1797 .0108 .006 .10 .023 2.17 .34 .0082 .600 1.48 .009 .067 .038 8.74 .0917 .10 .0449 .629 .863 .022 .33 .0094 .10 2.11 .021 .087 3.10 .044 9.18 12.59 .646 .022 .0312 .0097 .098 2.53 .031 .045 9.42 ----.33 .10 .0200 .0094 .653 .909 .022 13.26 .33 -044 9.52 4.65 .10 . 047 .103 .31 .0155 .0106 .691 .022 3.59 5.26 -049 10.07 .10 .068 .129 13.75 .27 .0112 .0143 .769 .943 .019 .180 .066 .127 11.21 .10 . 24 .0093 .0153 .833 .016 .165 6.81 .071 12.14 .10 4.64 .220 .19 .0072 .0220 1.006 -----.013 5.28 .306 .342 7.74 .102 14.67 .10 .528 .862 .020 .038 0 6.11 9.98 .23 0 0 .20 .83 .0100 .530 .020 .23 .9975 .63 .002 .042 .029 6.14 .20 .3594 .0144 .564 .971 .019 .22 11.24 1.06 .008 .087 1.38 .042 6.53 .20 .21 .0137 .595 .018 6.89 .040 .20 1.48 .015 .129 1.93 .961 .0898 .0139 .018 .041 7.21 11.12 .21 .20 .168 2.76 2.11 .031 7.46 -644 .20 .0625 .0134 .017 .194 3.31 .039 2.53 .043 .20 .655 .964 .017 3.17 4.14 .044 7.58 11.16 .20 .0399 .0150 .075 .210 .20 .667 7.72 .19 .0165 .017 3.59 4.69 .048 .0311 .106 .228 .20 .0176 .693 .989 4.22 11.45 .0225 .014 .261 .0515 .157 5.52 .20 9.47 .12 . 525 .936 .012 5.31 .30 0 0 .054 0 .530 .551 .585 1.4963 .0150 .011 .003 .058 .034 5.36 .11 .63 -77 .30 5.57 10.11 .09 -5391 .0216 1.000 .008 .048 1.06 -102 1.29 .30 -012 .008 1.80 .049 5.92 .09 .2750 -0220 1.48 .024 .170 .30 1.000 .0184 .604 .008 .041 6.11 10.11 .09 .1348 .041 .211 2.58 .30 2.11 .08 .0936 .0184 .623 .008 2.53 6.30 .30 .059 .250 3.09 .041 6.36 10.11 .08 .0599 .0202 .629 1.000 .008 .30 3.17 .101 .261 3.87 .045 3.59 .048 6.30 .07 .0466 .0216 .623 .007 .250 4.38 .30 .139 -----.0337 .0232 .623 .003 5.16 .052 6.30 -----.03 .30 .250 .207 6.36 0 .0278 .0284 .629 0 .261 5.67 .063 4.64 .30 .306 1.000 .006 . 525 4.83 9.18 .05 .40 0 0 .072 0 .04 .525 .005 1.9950 .0201 .63 .004 .072 .037 4.83 .40 .7188 .549 1.000 9.18 .03 .0252 .003 1.06 .014 .133 1.23 .046 5.05 .40 .578 .002 .02 .0257 5.31 .40 1.48 .028 .210 1.72 .047 9.18 .01 .1797 .0211 -593 1.000 .001 5.45 .40 2.11 .047 .255 2.46 .039 0 .1248 .0206 .608 0 .066 5.59 .038 .40 2.53 .291 2.96 5.59 9.18 -.01 .0799 .0250 .608 1.000 -- 001 .046 .125 .291 3.70 -40 3.17 .281 4.19 .051 5.59 -.03 .0622 .0278 -608 -.003 -40 3.59 .179 ------.008 4.22 .261 4.93 .068 -.08 .0449 .0367 .587 .40 .327 8.53 .525 1.000 0 4.48 0 .50 0 0 .087 0 -.01 .525 -.001 4.48 2.4938 .0249 .50 .63 .005 .087 .040 .540 1.000 -.004 .50 4.61 8.53 .8985 .0252 1.06 -.03 :014 .139 1.18 .040 .048 4.86 -.04 .4583 .0302 .570 -.005 1.66 .236 1.48 .033 -.04 .583 .281 .044 4.97 8.53 .2246 .0274 1.000 -.005 2.37 .50 2.11 .061 2.84 .044 -.06 .1560 .0278 --007 2.53 .307 5.01 .089 .50 .581 3.17 .271 .049 4.96 8.53 -.07 .0999 .0309 1.000 -.008 .155 3.55 .50 4.03 4.90 -.11 .0777 .0373 -574 -.013 .240 .250 .059 -50

TABLE VII.- Continued EXPERIMENTAL HYDRODYNAMIC DATA FOR A BODY OF REVOLUTION OF

$^{\mathrm{C}}\!$	CVQ	c _{RQ}	c_{M_Q}	$c_{\Lambda^{\nabla}}$	c _D	$\frac{x}{\left(\frac{\triangle}{\overline{w}}\right)^{1/\overline{3}}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$c_{L_{\mathbf{Q}}}$	c_{D_Q}	T X	<u>l</u>	<u>h</u> L
							T = 40						
0 0 0 0 0 0	0 .63 1.06 1.48 2.11 2.53	0 .001 .002 .002 .007	0 0 0 0 0						0 0 0 0	0.0050 .0036 .0018 .0031 .0034	0.500 .500 .500 .500	0.364 .332 .445	0.049 .049 .049 .049 .048 .045
0 0 0 0	3.17 3.59 4.22 4.64 5.28	.020 .029 .047 .078 .157	0 0 .012 .027 .154						0 0 0 0	.0040 .0045 .0053 .0072	.500 .500 1.045 1.206 2.584	.493 .549	.044 .043 .040 .038 .031
.10 .10 .10 .10 .10	0 .63 1.06 1.48 2.11 2.53	0 .001 .005 .009 .020	117 113 091 080 066 060	0 .93 1.55 2.17 3.10 3.72	0.023 .042 .038 .042 .042	4.76 4.85 5.32 5.59 5.90 6.03	9.81 10.10 9.76	0.43 .44 .43 .43 .43	.4988 .1797 .0917 .0449	.0050 .0090 .0082 .0090	.326 .333 .364 .383 .405 .413	.673 .692 .669	.030 .030 .030 .030 .030
.10 .10 .10 .10	3.17 3.59 4.22 4.64 5.28	.047 .066 .110 .139 .216	048 035 .021 .119 .281	4.65 5.26 6.19 6.81 7.74	.044 .048 .058 .060	6.27 6.58 7.73 9.64 12.55	9.89	.39 .38 .35 .31 .24	.0200 .0155 .0112 .0093 .0072	.0094 .0103 .0124 .0129 .0155	.430 .451 .530 .661 .860	.678	.027 .026 .024 .021 .016
.20 .20 .20 .20 .20	0 .63 1.06 1.48 2.11 2.53	0 .002 .009 .015 .032 .041	189 176 133 113 086 069	0 .83 1.38 1.93 2.76 3.31	.029 .047 .040 .042 .037	4.17 4.27 4.67 4.83 5.05 5.20	8.96 9.02 8.87	.24 .23 .20 .22 .23	.9975 .3594 .1833 .0898 .0624	.0100 .0162 .0137 .0144 .0128	.360 .369 .403 .417 .436 .449	.774 .779 .766	.021 .019 .018 .019 .019
.20 .20 .20 .20	3.17 3.59 4.22 4.64 5.28	.066 .087 .132 .176 .243	046 005 .076 .200 .389	4.14 4.69 5.52 6.07 6.90	.039 .040 .043 .048	5.42 5.42 5.74 7.41 8.71	9.04	.19 .18 .16 .11	.0399 .0311 .0225 .0186 .0144	.0132 .0135 .0148 .0163 .0175	.468 .496 .555 .640	.781	.017 .016 .014 .010
.30 .30 .30 .30 .30	0 .63 1.06 1.48 2.11 2.53	0 .002 .012 .021 .041 .053	233 221 159 122 092 060	0 .77 1.29 1.80 2.58 3.09	.022 .048 .043 .041 .037	3.90 3.95 4.27 4.46 4.61 4.75	8.38 8.48 8.45	.13 .12 .11 .12 .13	1.4963 .5391 .2750 .1348 .0936	.0100 .0216 .0192 .0184 .0165	.386 .390 .422 .441 .456 .470	.828 .839 .835	.012 .012 .011 .012 .013 .012
.30 .30 .30 .30	3.17 3.59 4.22 4.64 5.28	.082 .110 .165 .207 .285	013 .037 .174 .287 .543	3.87 4.38 5.16 5.67 6.45	.037 .038 .041 .043 .046	5.00 5.23 5.90 6.43 7.59	8.31	.12 .10 .07 .05	.0599 .0466 .0337 .0278 .0216	.0164 .0171 .0185 .0192 .0205	.494 .517 .583 .636 .750	.821	.012 .010 .007 .005
.40 .40 .40 .40 .40	0 .63 1.06 1.48 2.11 2.53	.028	247 226 153 113 071 040	0 .74 1.23 1.72 2.46 2.96	.028 .053 .047 .039	3.76 3.81 4.07 4.21 4.37 4.46	8.06 8.19 8.05	.05 .04 .02 .04 .05	1.9950 .7188 .3666 .1797 .1248	.0150 .0288 .0257 .0211	.409 .415 .443 .458 .475 .485	.878 .892 .876	.005 .004 .003 .004 .005
.40 .40 .40 .40	3.59 4.22 4.64	.141	.423	4.19 4.93 5.42	.039 .040 .041 .046	4.93 5.41 5.97	8.05	.04 .01 01 05 07	.0799 .0622 .0449 .0371 .0288	.0212 .0219 .0225 .0249 .0262	.589	.876	.001 001 005

TABLE VII. - Continued

$^{\mathrm{C}}\!\Delta_{\mathrm{Q}}$	c _{VQ}	c_{R_Q}	c _{MQ}	c^{\Delta \!	$c_{D\Delta}$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	c_{L_Q}	c_{D_Q}	<u>x</u>	<u>1</u>	<u>h</u> L
						τ = 4 ⁰	- Concl	uded					
0.50 .50 .50 .50 .50 .50 .50	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .004 .019 .033 .055 .078 .127 .172 .254	-0.231 206 134 086 048 009 .077 .169 .362	0 .71 1.18 1.66 2.37 2.84 3.55 4.03 4.74	0.032 .054 .048 .039 .039 .040 .042 .045	3.69 3.75 3.92 4.05 4.14 4.25 4.46 4.68 5.15	7.80 7.92 7.74 7.80	-0.02 03 04 03 02 03 05 06 09	2.4938 .8986 .4583 .2246 .1560 .0999 .0777 .0562	0.0200 .0341 .0302 .0247 .0243 .0254 .0267 .0285	0.432 .439 .460 .475 .485 .498 .523 .549	0.915 .929 .908 -915	-0.002 003 005 003 003 005 007 011
							τ = 80				-		
0 0 0 0 0	0 .63 1.06 1.48 2.11 2.53	0 0 0 0 .002 .003	0 0 004 004 004						0 0 0 0	0 0 0 0 .0009 .0009	 -1.317 -1.090	.134	.073 .075 .075 .075 .074
0 0 0 0	3.17 3.59 4.22 4.64 5.28	.009 .014 .047 .092 .183	003 0 .021 .099 .303						0 0 0 0	.0018 .0022 .0053 .0085 .0132	.197 .500 .988 1.658 2.265	.222 .399 	.070 .069 .069 .052
.10 .10 .10 .10	0 1.06 1.48 2.11 2.53	0 .002 .008 .012 .021 .032	176 164 153 146 145 129	0 .93 1.55 2.17 3.10 3.72	.046 .067 .051 .044	3.46 3.74 3.99 4.17 4.23 4.60	7.57 7.57 7.29	.61 .59 .60 .60 .61	.4988 .1797 .0917 .0449	.0100 .0144 .0110 .0094 .0100	.237 .256 .273 .286 .290 .316	.519 .519 .500	.042 .041 .041 .041 .041
.10 .10 .10 .10	3.17 3.59 4.22 4.64 5.28	.059 .085 .134 .174 .250	070 013 .098 .230 .464	4.65 5.26 6.19 6.81 7.74	.055 .061 .070 .075 .084	5.87 7.05 9.12 11.34 14.80	7.86 8.50 8.91	• 54 • 50 • 44 • 36 • 26	.0200 .0155 .0112 .0093 .0072	.0118 .0132 .0150 .0162 .0180	.403 .483 .625 .778	.539 .583 .611	.037 .034 .030 .025
.20 .20 .20 .20 .20	0 1.06 1.48 2.11 2.53	0 .005 .014 .021 .033 .049	278 263 237 226 212 194	0 .83 1.38 1.93 2.76 3.31	.073 .074 .056 .043 .045	3.38 3.53 3.78 3.86 4.00 4.17	7.07 7.07 6.87	.31 .29 .30 .32 .33	.9975 .3594 .1833 .0898 .0624	.0249 .0252 .0192 .0148 .0153	. 292 . 305 . 326 . 333 . 345 . 360	.611	.027 .025 .026 .028 .029
.20 .20 .20 .20	3.17 3.59 4.22 4.64 5.28	.080 .115 .174 .219 .290	092 0 .200 .251 .622	4.14 4.69 5.52 6.07 6.90	.047 .052 .057 .059	5.03 5.79 7.33 7.68 10.26	7.12 7.52	.26 .24 .17 .12	.0399 .0311 .0225 .0186 .0144	.0160 .0179 .0195 .0203 .0208	.434 .500 .633 .663 .886	.615	.022 .021 .014 .011
.30 .30 .30 .30 .30	0 .63 1.06 1.48 2.11 2.53	0 .005 .021 .028 .047 .061	336 321 288 271 259 216	0 .77 1.29 1.80 2.58 3.09	.056 .084 .057 .047	3.37 3.45 3.62 3.71 3.79 4.01	6.89 6.98 6.79	.16 .12 .15 .18 .15	1.4963 .5391 .2750 .1348 .0936	.0249 .0377 .0257 .0211 .0190	• 333 • 341 • 358 • 367 • 375 • 396	.690	.016 .012 .015 .018 .015
.30 .30 .30 .30	3.17 3.59 4.22 4.64 5.28	.106 .139 .204 .254 .306	080 .032 .267 .434 .698	3.87 4.38 5.16 5.67 6.45	.047 .048 .051 .053 .049	4.67 5.21 6.28 7.01 8.12	6.89 7.25	.13 .10 .05 .03	.0599 .0466 .0337 .0278 .0216	.0212 .0216 .0229 .0236 .0220	.462 .515 .621 .693 .803	.682	.012 .010 .005 .003 ~.001

TABLE VII.- Continued EXPERIMENTAL HYDRODYNAMIC DATA FOR A BODY OF REVOLUTION OF

C_{Δ_Q}	$c_{\Lambda^{d}}$	c_{R_Q}	c_{M_Q}	CA ^V	CDA	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{\frac{h}{\left(\triangle\atop \overline{w}\right)^{1/3}}$	c_{L_Q}	c_{D_Q}	x L	<u>l</u>	<u>h</u> L
					-		- Conclu	ded					
0.40 .40 .40 .40 .40	0 .63 1.06 1.48 2.11 2.53	0 .007 .026 .038 .061 .078	-0.362 350 311 289 224 211	0 -74 1.23 1.72 2.46 2.96	0.064 .086 .064 .051 .045	3.35 3.41 3.55 3.62 3.83 3.90	6.81 6.81 6.57	0.05 .05 .05 .09 .09	1.9950 .7188 .3666 .1797 .1248	0.0349 .0467 .0348 .0274 .0243	0.364 .371 .386 .394 .417 .424	.742	0.005 .006 .006 .009 .010 .008
.40 .40 .40 .40	3.17 3.59 4.22 4.64 5.28	.122 .160 .221 .266 .341	055 .053 .302 .462 .789	3.70 4.19 4.93 5.42 6.16	.045 .046 .046 .046	4.42 4.77 5.55 6.04 7.01	6.78 7.07	.04 .03 0 04 04	.0799 .0622 .0449 .0371 .0288	.0244 .0249 .0248 .0247 .0245	.481 .519 .604 .657 .763	.738	.005 .003 -0 005 005
.50 .50 .50 .50 .50 .50 .50	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .006 .032 .047 .071 .094 .143 .188 .259	352 342 301 287 243 184 006 .139 .414	0 .71 1.18 1.66 2.37 2.84 3.55 4.03 4.74	.048 .091 .068 .051 .047 .045 .046	3.36 3.40 3.51 3.54 3.65 3.81 4.25 4.61 5.24	6.79 	04 03 02 0 0 01 03 05 08	2.4938 .8985 .4583 .2246 .1560 .0999 .0777 .0562	.0299 .0575 .0431 .0319 .0293 .0286 .0292	.394 .398 .411 .415 .428 .447 .498 .540	.796 -803 -775 -788 -812	004 003 0 0 001 004 006 009
						τ	= 120						
0 0 0 0 0 0	0 1.06 1.48 2.11 2.53	0 .001 .001 .002 .004 .005	0 0 0 0 0						0 0 0 0 0	.0050 .0018 .0018 .0018	.500 .500 .500 .500	.164	.105 .108 .108 .108 .104 .102
0 0 0 0 0	3.17 3.59 4.22 4.64 5.28	.014 .024 .059 .106	0 .007 .037 .118 .312						0 0 0 0 0	.0028 .0037 .0066 .0098 .0132	.500 .704 .949 1.298 1.716	.152	.094 .091 .081 .072 .059
.10 .10 .10 .10	.63 1.06 1.48 2.11 2.53	.005 .011 .015 .027 .042	185 184 180 174 153 113	0 .93 1.55 2.17 3.10 3.72	.116 .092 .064 .056	3.21 3.28 3.40 3.62 4.11 5.01	6.54 6.39 6.41	.79 .79 .83 .86 .82	.4988 .1797 .0917 .0449	.0249 .0198 .0137 .0121	.220 .223 .233 .248 .282 .243	.449 .438 .440	.054 .054 .057 .059 .056
.10 .10 .10	3.17 3.59 4.22 4.64 5.28	.073 .103 .150 .190 .271	050 0 .133 .257 .474	4.65 5.26 6.19 6.81 7.74	.068 .074 .078 .082	6.33 7.29 9.52 10.66 11.50	6.44 7.73	.69 .65 .56 .51	.0200 .0155 .0112 .0093 .0072	.0146 .0160 .0168 .0176 .0195	.434 .500 .653 .731 .788	.441	.047 .045 .038 .035 .028
.20 .20 .20 .20 .20	0 .63 1.06 1.48 2.11 2.53	0 .006 .021 .028 .046 .063	300 294 283 279 243 180	0 .83 1.38 1.93 2.76 3.31	.087 .110 .075 .061	3.16 3.24 3.36 3.40 3.78 4.32	6.26	.41 .45 .48 .45	.9975 .3594 .1833 .0898 .0624	.0299 .0377 .0257 .0207 .0197		.540 .554 .547	.036 .036 .039 .041 .039 .036
.20 .20 .20	3.59 4.22 4.64	.137 .200 .242	055 .026 .216 .357 .638	4.14 4.69 5.52 6.07 6.90	.061 .062 .066 .066	5.35 5.99 7.36 8.27 10.01	6.34	.35 .31 .28 .24	.0399 .0311 .0225 .0186 .0144	.0210 .0213 .0225 .0225 .0220	.517 .636 .714	.602	.027

TABLE VII - Continued

						x	11	_ h			x	1	h
°C∆Q	CAS	CRQ	C _{MQ}	c^{A^{\nabla}}	$C_{D_{\Delta}}$	$\left(\frac{\triangle}{\overline{w}}\right)^{1/3}$	$\left(\frac{\triangle}{\overline{w}}\right)^{1/3}$	$\left(\stackrel{\text{h}}{\Leftrightarrow} \right)^{1/3}$	C _{LQ}	c_{D_Q}	x L	l L	Ī,
						τ = 12 ⁰	- Concl	uded					
0.30 .30 .30 .30 .30	0 .63 1.06 1.48 2.11 2.53	0 .008 .028 .040 .059 .078	-0.373 362 356 342 289 207	0 .77 1.29 1.80 2.58 3.09	0.089 .112 .082 .059 .054	3.15 3.22 3.28 3.35 3.64 4.05	6.22 6.18 6.18	0.21 .21 .23 .26 .25	1.4963 .5392 .2750 .1348 .0936	0.0399 .0503 .0367 .0265 .0243	0.311 .318 .324 .331 .360 .400	.611	0.021 .021 .022 .026 .024 .021
.30 .30 .30 .30	3.17 3.59 4.22 4.64 5.28	.127 .169 .233 .280 .350	040 .067 .293 .464 .779	3.87 4.38 5.16 5.67 6.45	.057 .059 .059 .058 .056	4.87 5.36 6.34 7.03 8.25	6.11	.17 .14 .11 .09	.0599 .0466 .0337 .0278 .0216	.0254 .0263 .0262 .0260 .0252	.481 .530 .627 .695 .816	.650	.016 .014 .011 .009
.40 .40 .40 .40 .40	0 .63 1.06 1.48 2.11 2.53	0 .007 .038 .052 .075 .099	403 395 384 371 294 180	0 .74 1.23 1.72 2.46 2.96	.064 .126 .088 .062 .057	3.19 3.24 3.29 3.35 3.62 4.01	6.20 6.18 6.13	.06 .07 .11 .13 .10	1.9950 .7188 .3666 .1797 .1248	.0349 .0683 .0477 .0337 .0309	• 347 • 352 • 358 • 364 • 394 • 436	.675	.007 .008 .012 .014 .011
.40 .40 .40 .40	3.17 3.59 4.22 4.64 5.28	.148 .193 .251 .289 .348	.007 .119 .337 .516 .814	3.70 4.19 4.93 5.42 6.16	.054 .055 .052 .049	4.61 4.96 5.62 6.15 6.97	6.16	.05 .02 .02 .01	.0799 .0622 .0449 .0371 .0288	.0295 .0300 .0282 .0268 .0250	.502 .540 .612 .669 .758	.671	.005 .002 .002 .001
.50 .50 .50 .50 .50 .50 .50	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .009 .046 .061 .092 .113 .169 .216 .280	398 394 388 368 267 170 004 .130 .389	0 .71 1.18 1.66 2.37 2.84 3.55 4.03 4.74	.071 .131 .089 .066 .056 .054 .053	3.23 3.25 3.29 3.34 3.60 3.85 4.25 4.57 5.17	6.24 6.18 6.18 6.06 6.18	06 07 03 0 03 03 06 08	2.4938 .8985 .4583 .2246 .1560 .0999 .0777 .0562	.0449 .0827 .0559 .0413 .0353 .0337 .0336 .0314	.379 .381 .386 .392 .422 .451 .498 .536	.731 .724 .724 .710	007 008 004 0 001 004 005 006
						т	= 160						
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 1.06 1.48 2.11 2.53	0 .001 .001 .001 .002	0 004 004 007 004 004				===	====	0 0 0 0 0 0	.0050 .0018 .0009 .0009	-2.622 -2.622 -2.090 422 422	.124	.139 .142 .143 .143 .145
0 0 0 0 0 0 0	3.17 3.59 4.22 4.64 5.28	.007 .021 .056 .094 .174	013 .012 .027 .006 .241				===		0 0 0 0	.0016 .0033 .0063 .0087 .0125	534 .816 .763 .535 1.249	.155	.134 .123 .105 .094 .079
.10 .10 .10 .10	0 .63 1.06 1.48 2.11 2.53	0 .007 .014 .019 .035 .052	196 206 197 197 194 154	0 .93 1.55 2.17 3.10 3.72	.162 .117 .081 .073	2.91 2.75 3.03 3.12 3.34 4.30	5.87 5.66 5.98	1.01 1.03 1.07 1.07	.4988 .1797 .0917 .0449	.0349 .0252 .0174 .0157	.199 .189 .208 .214 .229	.403	.069 .069 .071 .073 .073
.10 .10 .10 .10	3.17 3.59 4.22 4.64 5.28	.075 .107 .153 .193 .254	129 0 .129 .216 .414	4.65 5.26 6.19 6.81 7.74	.070 .077 .080 .083 .085	4.91 7.29 9.30 10.26 11.46	6.23	.95 .84 .75 .71	.0200 .0155 .0112 .0093 .0072	.0150 .0166 .0172 .0179 .0183	•337 •500 •638 •703 •786	.427	.065 .058 .051 .049

 $\mbox{ TABLE VII - Continued} \\ \mbox{ EXPERIMENTAL HYDRODYNAMIC DATA FOR A BODY OF REVOLUTION OF }$

C_{Δ_Q}	c_{V_Q}	c_{R_Q}	c_{M_Q}	c^{Λ}	$c_{D_{\Delta}}$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{W}\right)^{1/3}}$	$\frac{h}{\left(\frac{\Delta}{\overline{w}}\right)^{1/3}}$	c_{L_Q}	c_{D_Q}	$\frac{\mathbf{x}}{\mathbf{L}}$	<u>1</u>	<u>h</u>
							- Concl						
0.20 .20 .20 .20 .20	0 .63 1.06 1.48 2.11 2.53	0 .009 .025 .033 .054 .076	-0.320 326 321 306 237 186	0 .83 1.38 1.93 2.76 3.31	0.131 .131 .088 .071 .069	2.94 2.92 3.02 3.18 3.83 4.30	5.73 5.60 5.73	0.53 .53 .60 .62 .56 .54	0.9975 .3594 .1833 .0898 .0624	0.0449 .0449 .0302 .0243 .0237	0.254 .252 .261 .275 .331	.484	0.046 .046 .052 .053 .049
.20 .20 .20 .20	3.17 3.59 4.22 4.64 5.28	.120 .155 .207 .247 .306	086 0 .180 .302 .547	4.14 4.69 5.52 6.07 6.90	.070 .071 .068 .067 .064	5.13 5.79 7.02 7.78 9.17	5.97 	.49 .47 .42 .39 .38	.0399 .0311 .0225 .0186 .0144	.0240 .0241 .0232 .0229	.443 .500 .606 .672 .792	.516	.042 .041 .036 .033 .033
.30 .30 .30 .30 .30	0 .63 1.06 1.48 2.11 2.53	0 .012 .036 .048 .071 .098	387 394 403 373 285 210	0 .77 1.29 1.80 2.58 3.09	.134 .144 .098 .071 .068	3.04 3.04 3.04 3.22 3.66 4.05	5.82 5.64 5.79	.26 .28 .34 .35 .31	1.4963 .5391 .2750 .1348 .0936	.0599 .0647 .0440 .0319	.301 .301 .301 .318 .362 .400	•575 •558 •572	.026 .027 .033 .035 .031 .027
.30 .30 .30 .30	3.17 3.59 4.22 4.64 5.28	.197 .193 .243 .284 .343	076 .104 .222 .322 .587	3.87 4.38 5.16 5.67 6.45	.088 .067 .061 .059	4.71 5.50 5.98 6.36 7.35	5.97	.26 .26 .24 .22	.0599 .0466 .0337 .0278 .0216	.0393 .0300 .0273 .0264 .0247	.466 .544 .591 .629	.590	.026 .025 .023 .022 .021
.40 .40 .40 .40 .40	0 .63 1.06 1.48 2.11 2.53	0 .014 .047 .060 .087 .118	414 425 436 403 281 196	0 .74 1.23 1.72 2.46 2.96	.129 .156 .101 .072 .068	3.13 3.12 3.12 3.24 3.66 3.95	5.76 5.58 5.65	.07 .09 .15 .17 .13	1.9950 .7188 .3666 .1797 .1248	.0698 .0845 .0550 .0391 .0368	.341 .339 .339 .352 .398 .430	.627 .607 .615	.008 .010 .017 .019 .014
.40 .40 .40 .40	3.17 3.59 4.22 4.64 5.28	.179 .223 .289 .329 .394	046 .077 .322 .496 .749	3.70 4.19 4.93 5.42 6.16	.066 .064 .060 .056	4.46 4.83 5.53 6.02 6.66	5.74	.11 .10 .09 .07	.0799 .0622 .0449 .0371 .0288	.0357 .0347 .0325 .0305 .0283	.485 .525 .602 .655 .725	.625	.012 .011 .010 .008 .010
.50 .50 .50 .50 .50 .50 .50	.63 1.06 1.48 2.11 2.53 3.17 3.59	0 .018 .061 .076 .109 .143 .210 .264 .345	414 425 441 399 357 163 .007 .149	0 .71 1.18 1.66 2.37 2.84 3.55 4.03 4.74	.143 .174 .111 .078 .071 .067 .065	3.18 3.17 3.15 3.25 3.38 3.86 4.28 4.61 5.22	5.72 5.69 5.77 5.72	07 04 .02 .03 0 0 01 01	2.4938 .8985 .4583 .2246 .1560 .0999 .0777 .0562	.0898 .1096 .0697 .0490 .0446 .0419 .0410	.373 .371 .369 .381 .396 .453 .502 .540	.671 .667 .676	009 005 .002 .004 0 0 001 001
							$\tau = 20^{\circ}$						
0 0 0 0 0 0	0 .63 1.06 1.48 2.11 2.53	.002	0 009 009 010 010						0 0 0 0	.0050 .0036 .0027 .0022	-2.562 -1.468 -1.014 336 123	.099	.166 .168 .168 .169 .170
0 0 0	3.17 3.59 4.22 4.64 5.28	.009	010 013 012 010						0 0 0 0	.0016 .0014 .0007 .0050	030 123 387 .419 .595	.072	.170 .172 .178 .119 .106

TABLE VII - Concluded

$^{\mathrm{C}}\!\triangle_{\!\mathrm{Q}}$	$^{\mathrm{C}}\mathrm{V}_{\mathrm{Q}}$	c_{R_Q}	c_{M_Q}	$c^{\Lambda^{\nabla}}$	$c_{D_{\Delta}}$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{\overline{w}}\right)^{1/3}}$	C _{LQ}	C _{DQ}	X L	<u>1</u> L	<u>h</u> L
							- Conclu			,			
0.10 .10 .10 .10	0 .63 1.06 1.48 2.11 2.53	0 .012 .024 .026 .049 .066	-0.190 206 201 185 165 147	0 .93 1.55 2.17 3.10 3.72	0.278 .200 .111 .102 .096	2.91 2.75 3.06 3.43 4.05 4.57	5.49 5.25 5.56	1.23 1.27 1.34 1.31 1.25 1.21	0.4988 .1797 .0917 .0449 .0312	0.0599 .0431 .0238 .0220 .0206	0.199 .189 .210 .235 .278 .314	.360	0.085 .087 .092 .090 .086
.10 .10 .10	3.17 3.59 4.22 4.64 5.28	.101 .129 .179 .200 .249	090 050 .032 .088 .209	4.65 5.26 6.19 6.81 7.74	.094 .093 .093 .086	5.79 6.52 7.76 8.47 9.55	5.67	1.18 1.14 1.07 1.05 1.04	.0200 .0155 .0112 .0093 .0072	.0202 .0201 .0201 .0186 .0179	.396 .447 .532 .581 .655	.388	.081 .078 .074 .072
.20 .20 .20 .20 .20	0 .63 1.06 1.48 2.11 2.53	0 .015 .033 .042 .071 .099	303 326 330 300 241 210	0 .83 1.38 1.93 2.76 3.31	.219 .173 .113 .093 .090	3.05 2.90 2.96 3.24 3.80 4.17	5.42 5.28 5.38	.64 .68 .74 .73 .68	.9975 .3594 .1833 .0898 .0624	.0748 .0593 .0385 .0319	.263 .250 .256 .280 .328 .360	.468	.055 .059 .064 .062 .059
.20 .20 .20 .20	3.17 3.59 4.22 4.64 5.28	.150 .183 .226 .268 .322	113 040 .068 .180 .322	4.14 4.69 5.52 6.07 6.90	.087 .083 .074 .073 .068	4.98 5.52 6.23 6.89 7.65	5.52	.63 .63 .61 .61	.0399 .0311 .0225 .0186 .0144	.0299 .0284 .0254 .0249	.430 .477 .538 .595 .661	.477	.054 .054 .052 .052
.30 .30 .30 .30 .30	0 .63 1.06 1.48 2.11 2.53	0 .021 .049 .059 .094 .132	383 403 414 377 300 243	0 .77 1.29 1.80 2.58 3.09	.234 .197 .121 .094 .092	3.02 2.97 2.97 3.20 3.62 3.95	5.43 5.32 5.36	.31 .36 .41 .40 .37	1.4963 .5391 .2750 .1348 .0936	.1047 .0881 .0541 .0422 .0412	.299 .294 .294 .316 .358 .390	.537 .526 .530	.031 .035 .041 .040 .037
.30 .30 .30 .30	3.17 3.59 4.22 4.64 5.28	.188 .220 .254 .291 .338	143 040 .082 .189 .348	3.87 4.38 5.16 5.67 6.45	.084 .076 .064 .060	4.44 4.89 5.38 5.81 6.36	5.47	.37 .37 .41 .41	.0599 .0466 .0337 .0278 .0216	.0375 .0342 .0285 .0270 .0243	.439 .483 .532 .574 .629	.540	.037 .037 .041 .041
.40 .40 .40 .40 .40	0 .63 1.06 1.48 2.11 2.53	0 .028 .065 .075 .113 .157	436 445 455 403 310 253	0 1.23 1.72 2.46 2.96	.257 .215 .127 .094 .090	3.01 3.01 3.04 3.22 3.58 3.80	5.27 5.34 5.39	.09 .15 .21 .21 .21	1.9950 .7188 .3666 .1797 .1248	.1397 .1168 .0687 .0508 .0490	.328 .328 .331 .350 .390 .413	.574 .581 .586	.010 .016 .022 .022 .022
.40 .40 .40 .40	3.17 3.59 4.22 4.64 5.28	.226 .263 .315 .343 .395	138 028 .149 .261 .454	3.70 4.19 4.93 5.42 6.16	.083 .076 .065 .059	4.19 4.52 4.03 5.31 5.80	5.35	.21 .21 .23 .25 .31	.0799 .0622 .0449 .0371 .0288	.0451 .0409 .0354 .0318 .0284	.456 .492 .547 .578 .631	.583	.022 .023 .025 .027 .034
.50 .50 .50 .50 .50 .50	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22	0 .028 .078 .089 .134 .179 .266 .310 .367	403 450 450 394 216 070 .027 .241	0 .71 1.18 1.66 2.37 2.84 3.55 4.03 4.74	.222 .223 .130 .096 .089 .084 .077	3.18 3.13 3.13 3.27 3.57 3.76 4.10 4.32 4.77	5.36 5.39 5.39 5.27	10 03 .04 .03 .04 .05 .05	2.4935 .8985 .4583 .2246 .1560 .0999 .0777 .0562	.1397 .1402 .0816 .0602 .0558 .0531 .0482	.373 .367 .367 .383 .419 .441 .481 .506	.629 .632 .632 .618	012 003 .005 .004 .004 .005 .006 .006

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$^{\mathrm{C}}\!$	$^{\mathrm{C}}\mathrm{V}_{\mathrm{Q}}$	$^{\mathrm{C}}_{\mathrm{R}_{\mathbf{Q}}}$	$^{\mathrm{C}}_{\mathrm{M}_{\mathrm{Q}}}$	C.V.	$c^{D\nabla}$	$\frac{x}{\left(\frac{\triangle}{\overline{w}}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{\overline{w}}\right)^{1/3}}$	$\frac{\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	c_{L_Q}	C _{DQ}	Ţ	<u>1</u>	h L
							= 8°						
0.20 .20 .20 .20 .20 .20 .20 .20	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64	0 .004 .019 .025 .045 .063 .071 .075 .081	-0.105 089 036 015 .055 .147 .209 .200 .200	0 .83 1.38 1.93 2.76 3.31 4.14 4.69 5.52 6.07	0.058 .099 .067 .058 .058 .041 .035 .026	2.04 2.22 2.69 2.86 3.44 4.21 4.70 4.62 4.62	4.96 5.18 5.13 4.96 4.32	0.28 .23 .26 .23 .20 .27 .34 .40	0.9975 .3594 .1833 .0898 .0624 .0399 .0311 .0225 .0186	0.0200 .0341 .0229 .0202 .0197 .0142 .0116 .0091	0.313 .335 .406 .432 .520 .635 .709 .698 .698	0.748 .781 .774 .748	0.042 .035 .035 .039 .035 .031 .040 .051 .060
.20	5.28 6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72	.094 .113 .139 .167 .199 .233 .275 .320	.200 .214 .243 .279 .339 .474 .454 .504	6.90 8.28 9.66 11.04 12.42 13.80 15.18 16.56 17.94	.020 .018 .015 .015 .012 .012 .012	4.60 4.70 4.90 5.14 5.56 6.51 6.27 6.54 7.03	3.90 3.66 3.51 3.44 3.41 3.36 3.26 3.36	. 46 . 49 . 52 . 53 . 54 . 55 . 54 . 56	.0144 .0100 .0073 .0056 .0044 .0036 .0030 .0025	.0068 .0057 .0051 .0047 .0044 .0042 .0041 .0038	.695 .709 .739 .776 .839 .983 .946 .987	.589 .552 .529 .518 .515 .515 .507	.070 .074 .079 .080 .080 .082 .083 .082
.40 .40 .40 .40 .40 .40	0 .63 1.06 1.48 2.11 2.53 3.17	0 .005 .039 .052 .077 .110	132 105 015 .011 .095 .244 .521	0 .74 1.23 1.72 2.46 2.96 3.70	.046 .129 .088 .064 .063	1.92 2.01 2.31 2.40 2.68 3.16 4.04	4.55 4.75 4.71 4.93	.05 .02 .01 .04 .02 03	1.9950 .7188 .3666 .1797 .1248	.0249 .0701 .0477 .0346 .0343	.365 .383 .439 .457 .509 .602 .769	.866 -903 .896 	.010 .004 .002 .007 .004 .006
.40 .40 .40 .40 .40 .40 .40	3.59 4.22 4.64 5.28 6.33 7.39 8.44	.183 .162 .154 .156 .168 .183	.564 .515 .479 .424 .394 .379	4.19 4.93 5.42 6.16 7.39 8.62 9.85	.052 .033 .026 .020 .015 .012	4.18 4.04 3.92 3.75 3.63 3.59 3.61	4.17 3.58 3.29 3.12 2.94	02 .15 .20 .28 .34 .37 .40	.0622 .0449 .0371 .0288 .0200 .0147 .0112	.0284 .0181 .0143 .0112 .0084 .0068	.795 .769 .746 .713 .691 .683	.792 .681 .626 .592 .559	.004 .028 .038 .053 .064 .070

TABLE IX

EXPERIMENTAL HYDRODYNAMIC DATA FOR A BODY OF REVOLUTION OF FINENESS

RATIO 9 WITH CHINE STRIPS BUT WITHOUT TAIL CONE

c_{Δ_Q}	C _{VQ}	c _{RQ}	c_{M_Q}	c _V	$c_{D_{\Delta}}$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	c_{L_Q}	c_{DQ}	T X	<u>Z</u>	h L
			A			,	= 8°						55
0.20 .20 .20 .20 .20 .20 .20 .20	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64	0 .004 .017 .023 .034 .042 .050 .056 .064	-0.196 174 134 107 063 0 .055 .067 .056 .047	0 .83 1.38 1.93 2.76 3.31 4.14 4.69 5.52 6.07	0.058 .089 .062 .045 .038 .029 .025 .021	2.11 2.23 2.58 2.82 3.19 3.73 4.20 4.29 4.20 4.21	5.54 5.67 5.47 5.18 4.51	0.28 .24 .27 .27 .27 .24 .29 .34 .40	0.9975 .3594 .1833 .0898 .0624 .0399 .0311 .0225 .0186	0.0200 .0305 .0211 .0153 .0131 .0100 .0087 .0072 .0062	0.248 .262 .303 .331 .375 .438 .493 .504 .493	0.650 666 643 608 531	0.032 .029 .029 .031 .031 .029 .034 .040
.20 .20 .20 .20 .20 .20 .20	5.28 6.33 7.39 8.44 9.50 10.55 11.61 12.66 13.72	.072 .084 .095 .112 .134 .155 .179 .203	.037 .007 0 013 012 017 007 007	6.90 8.28 9.66 11.04 12.42 13.80 15.18 16.56 17.94	.015 .012 .010 .009 .009 .008 .008	4.03 3.73 3.73 3.64 3.68 3.68 3.68	4.07 3.73 3.51 3.36 3.23 3.19 3.07 3.02 2.97	.46 .51 .53 .55 .56 .57 .58 .58	.0144 .0100 .0073 .0056 .0044 .0036 .0030 .0025	.0052 .0042 .0035 .0031 .0029 .0028 .0026 .0025	.473 .438 .438 .427 .427 .424 .432 .432 .432	.479 .438 .412 .395 .380 .375 .360 .355 .349	.054 .060 .062 .065 .066 .067 .068
.40 .40 .40 .40 .40 .40	0 .63 1.06 1.48 2.11 2.53 3.17	0 .009 .034 .043 .060 .079 .103	253 231 170 139 064 .050 .251	0 .74 1.23 1.72 2.46 2.96 3.70	.083 .113 .073 .050 .045 .038	2.10 2.11 2.39 2.49 2.74 3.14 3.80	5.31 5.37 5.24 5.24	.04 .03 .03 .06 .06 .04	1.9950 .7188 .3666 .1797 .1248 .0799	.0449 .0611 .0394 .0270 .0246 .0206	.311 .323 .354 .369 .406 .464 .562	.786 .796 .776	.007 .004 .009 .009 .005
.40 .40 .40 .40 .40 .40	3.59 4.22 4.64 5.28 6.33 7.39 8.44	.111 .122 .118 .122 .135 .144 .164	.311 .311 .275 .228 .153 .097 .060	4.19 4.93 5.42 6.16 7.39 8.62 9.85	.032 .025 .020 .016 .012 .010	3.99 3.97 3.86 3.70 3.47 3.27 3.16	4.56 3.95 3.53 3.26 3.08	.08 .17 .22 .27 .34 .39 .42	.0622 .0449 .0371 .0288 .0200 .0147 .0112	.0172 .0137 .0110 .0088 .0067 .0053 .0046	.591 .588 .571 .548 .513 .484 .467	.675 .585 .523 .482 .456	.011 .025 .032 .040 .051 .057

TABLE X $\mbox{EXPERIMENTAL HYDRODYNAMIC DATA FOR A BODY OF REVOLUTION OF FINENESS } \\ \mbox{RATIO 12 WITH CHINE STRIPS BUT WITHOUT TAIL CONE}$

C _{\triangle}	42	C _{VQ}	c _{RQ}	c_{M_Q}	$c^{\Lambda^{\nabla}}$	$c_{D_{\Delta}}$	$\frac{x}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{1}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\frac{\frac{h}{\left(\frac{\triangle}{w}\right)^{1/3}}$	$\mathbf{c}_{\mathbf{L}_{\mathbf{Q}}}$	c_{D_Q}	<u>x</u>	<u>1</u>	<u>h</u> L
								= 8°		45.4				
0.2	20 20 20 20 20 20 20 20 20 20 20	0 .63 1.06 1.48 2.11 2.53 3.17 3.59 4.22 4.64	0 .005 .014 .022 .032 .039 .049 .054 .060	-0.253 242 205 189 155 111 031 014 019	0 .83 1.38 1.93 2.76 3.31 4.14 4.69 5.52 6.07	0.073 .074 .059 .042 .036 .029 .025 .020	2.24 2.31 2.66 2.80 3.12 3.49 4.15 4.31 4.28 4.15	6.03 5.84 5.81	0.31 .30 .30 .29 .29 .30 .31 .36 .42	0.9975 .3594 .1833 .0898 .0624 .0399 .0311 .0225 .0186	0.0249 .0252 .0202 .0144 .0122 .0098 .0084 .0067	0.219 .226 .260 .274 .305 .341 .406 .421 .418	0.589 .589 .571 .568 .496	0.030 .029 .029 .029 .029 .030 .035 .041 .045
-4	20 20 20 20 20 20 1 20 1 20 1	5.28 6.33 7.39 8.44 9.50 0.55 1.61 2.66	.070 .074 .081 .089 .105 .119 .134 .147	049 088 126 154 180 204 228 268 280	6.90 8.28 9.66 11.04 12.42 13.80 15.18 16.56 17.94	.015 .011 .009 .007 .007 .006 .006 .005	4.03 3.69 3.40 3.17 2.98 2.80 2.63 2.31 2.21	4.42 3.97 3.66 3.41 3.19 3.04 2.90 2.72	.51 .56 .59 .62 .63 .65 .66 .66	.0144 .0100 .0073 .0056 .0044 .0036 .0030 .0025	.0050 .0037 .0030 .0025 .0023 .0021 .0020 .0018	.394 .361 .332 .310 .291 .274 .257 .226	.431 .388 .357 .333 .311 .297 .283 .266	.050 .055 .057 .061 .062 .064 .065 .065
	40 40 40 40 40 40 40 40	0 .63 1.06 1.48 2.11 2.53 3.17	0 .007 .027 .041 .056 .069	322 311 269 252 201 134 .025	0 .74 1.23 1.72 2.46 2.96 3.70	.064 .090 .070 .046 .041	2.40 2.44 2.60 2.66 2.83 3.07 3.59	5.93 5.92 5.68 5.72	.05 .05 .05 .08 .08	1.9950 .7188 .3666 .1797 .1248	.0353 .0481 .0374 .0252 .0226	.296 .300 .320 .327 .349 .378 .442	.731 .728 .700 .704	.006 .006 .006 .010 .010 .008
	40 40 40 40 40 40 40 40	3.59 4.22 4.64 5.28 6.33 7.39 8.44	.102 .109 .116 .122 .129 .139	.140 .184 .170 .123 .028 046	4.19 4.93 5.42 6.16 7.39 8.62 9.85	.029 .022 .020 .016 .012 .009	4.12 4.08 3.92 3.61 3.35	5.32 4.54 4.00 3.60 3.36	.05 .07 .16 .25 .33 .38	.0622 .0449 .0371 .0288 .0200 .0147	.0158 .0122 .0108 .0088 .0064 .0051	.490 .507 .502 .483 .445 .413	.654 .559 .493 .443	.006 .009 .020 .031 .041 .047

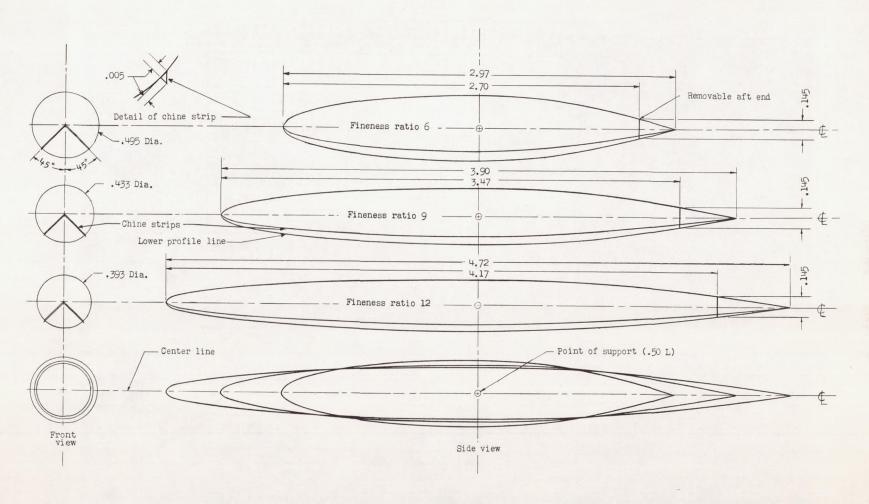
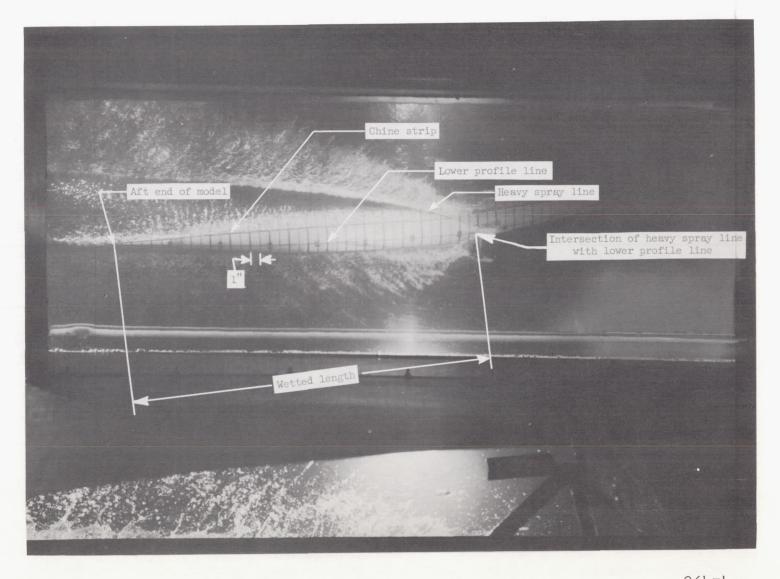


Figure 1.- Principal dimensions of models given in feet.



L-86474 Figure 2.- Underwater picture illustrating method of measuring wetted length.

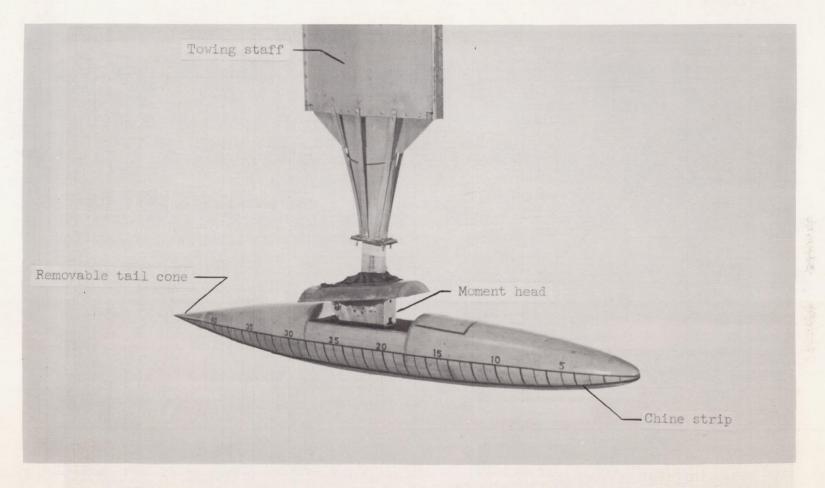


Figure 3.- Model mounted on towing staff.

L-73051.1

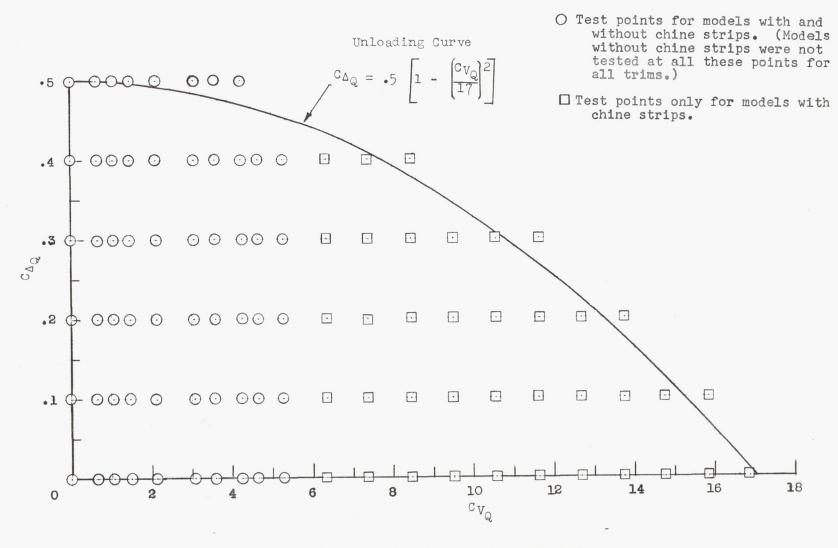


Figure 4.- Load-speed range investigated.

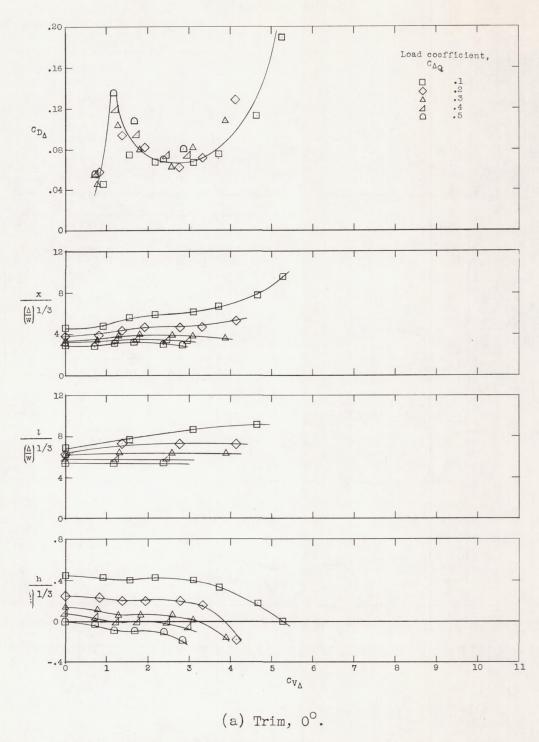
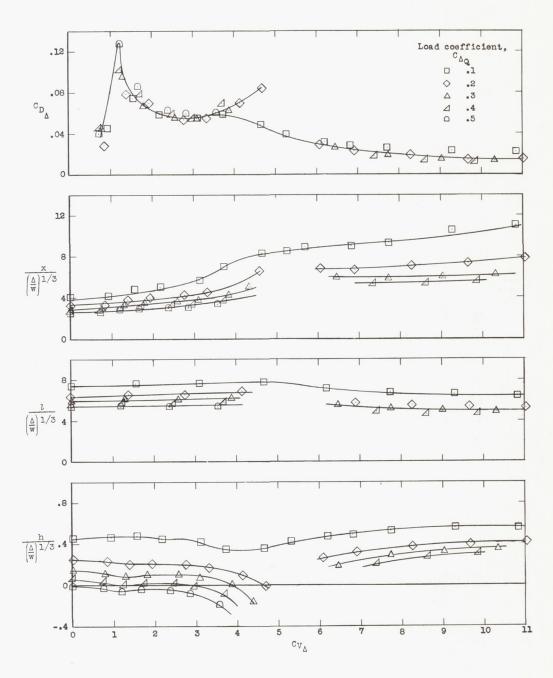


Figure 5.- Hydrodynamic characteristics of model with chine strips. Fineness ratio 6; displacement condition.



(b) Trim, 4°.

Figure 5.- Continued.

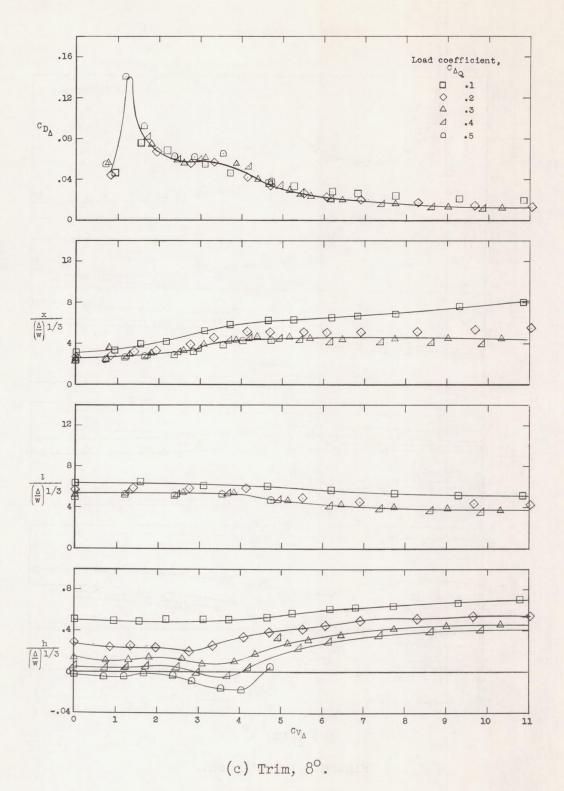


Figure 5.- Continued.

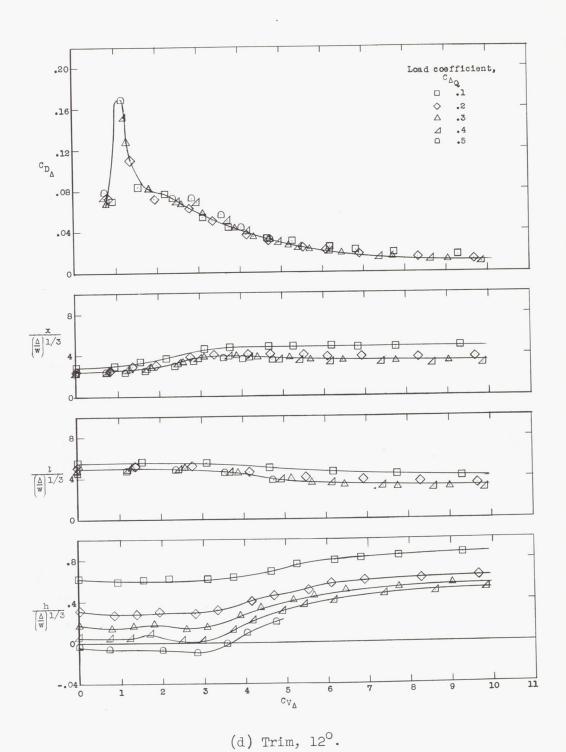
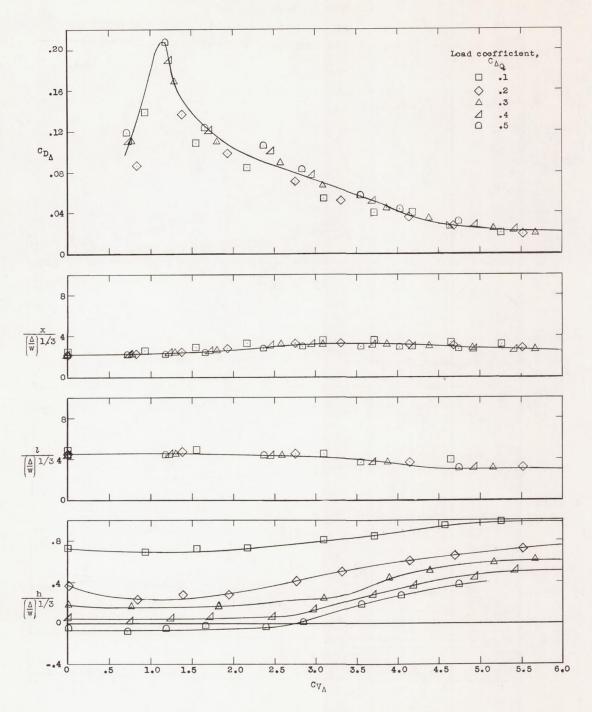
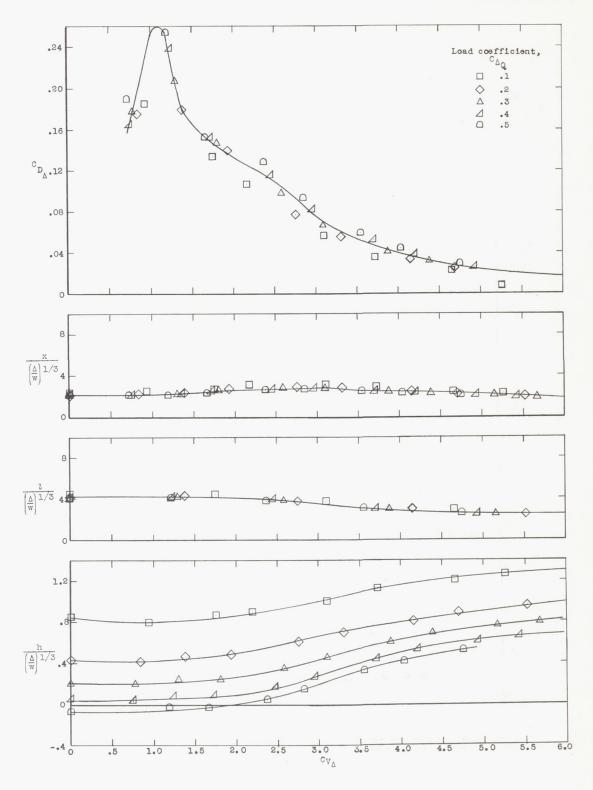


Figure 5.- Continued.



(e) Trim, 16°.

Figure 5.- Continued.



(f) Trim, 20° .

Figure 5.- Concluded.

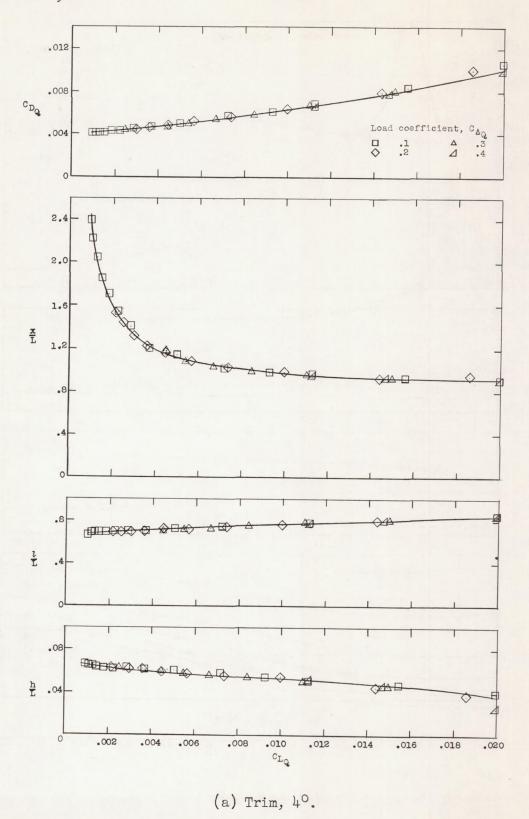
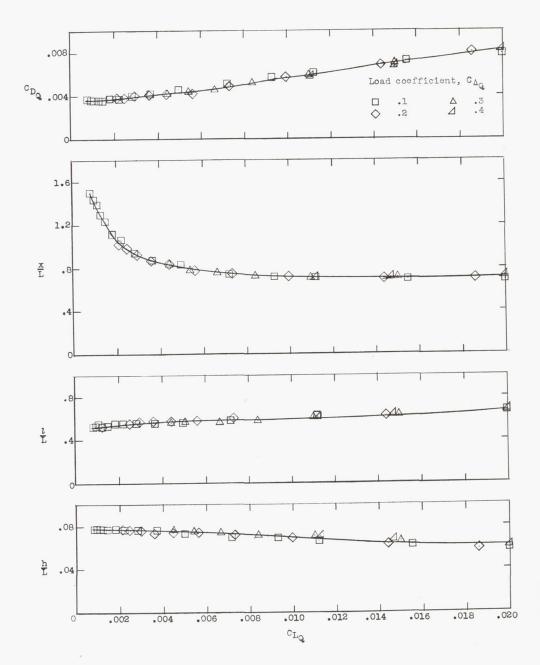
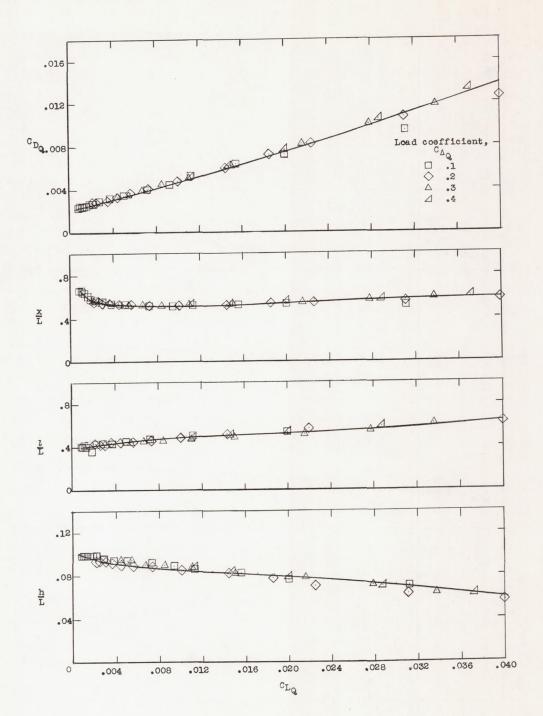


Figure 6.- Hydrodynamic characteristics of model with chine strips. Fineness ratio 6; planing condition.



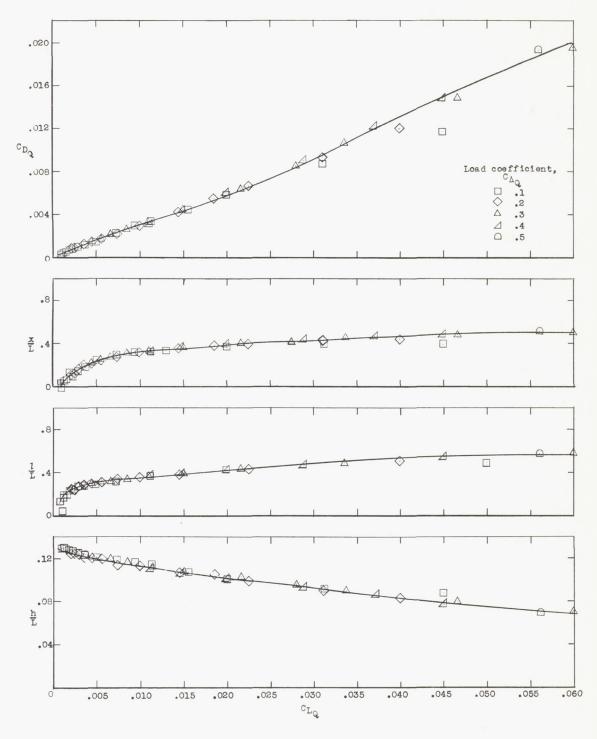
(b) Trim, 8° .

Figure 6.- Continued.



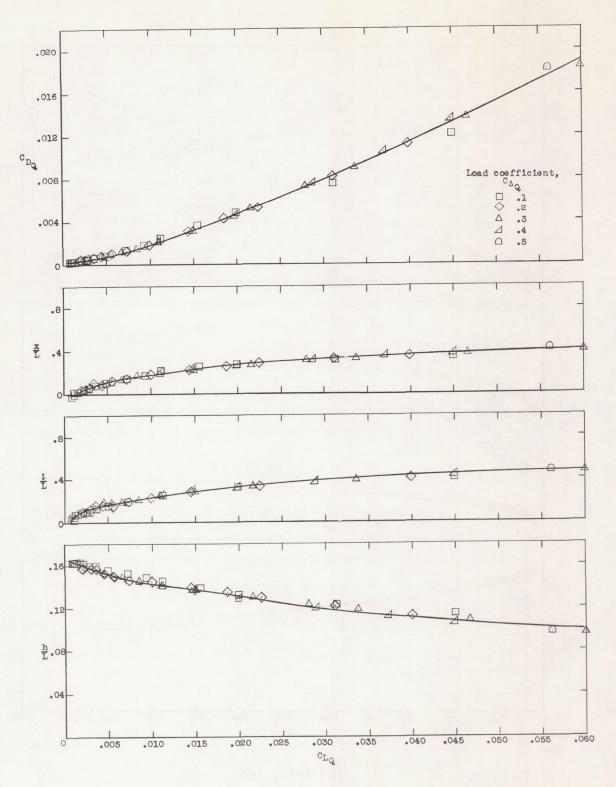
(c) Trim, 12°.

Figure 6.- Continued.



(d) Trim, 16°.

Figure 6.- Continued.



(e) Trim, 20°.

Figure 6.- Concluded.

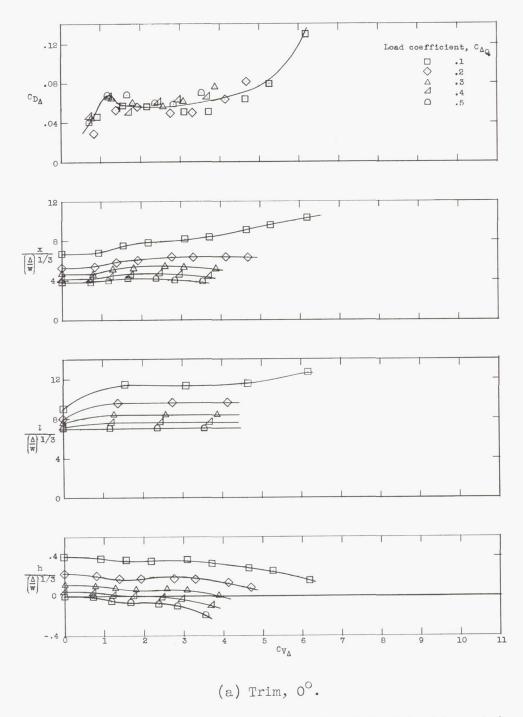
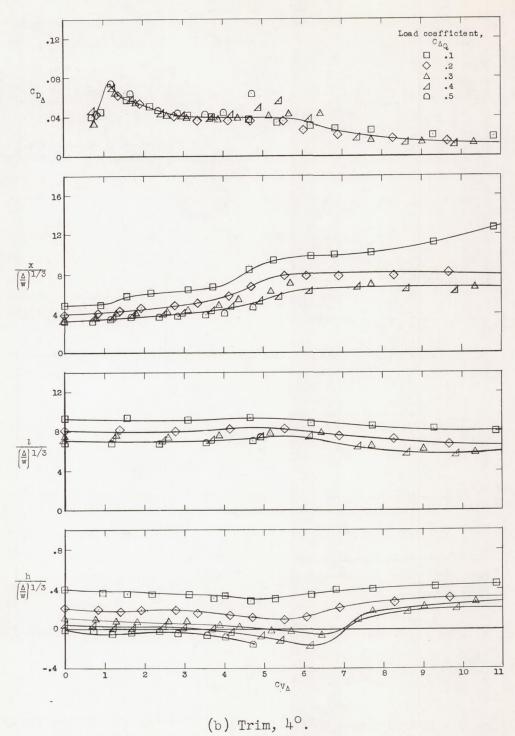
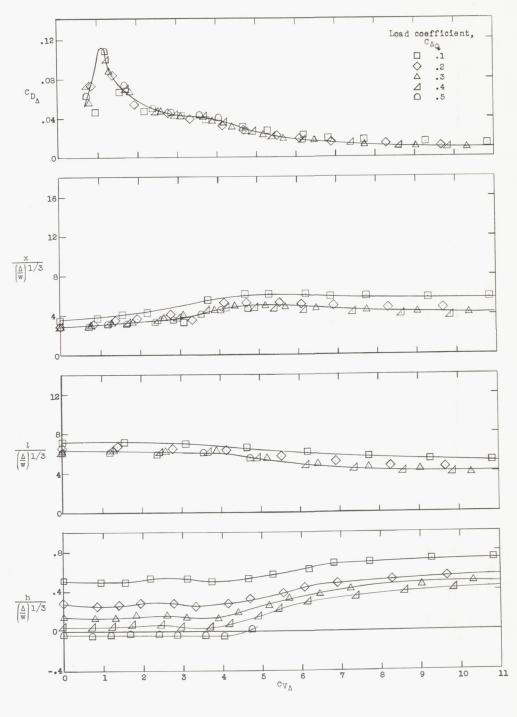


Figure 7.- Hydrodynamic characteristics of model with chine strips. Fineness ratio 9; displacement condition.



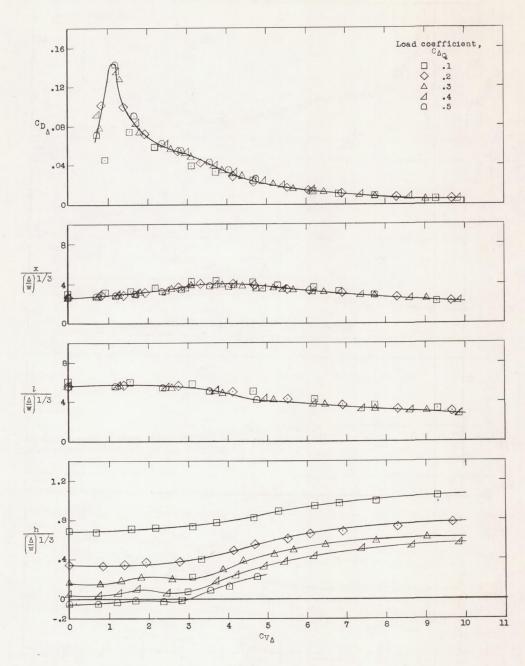
(5) 111111

Figure 7.- Continued.



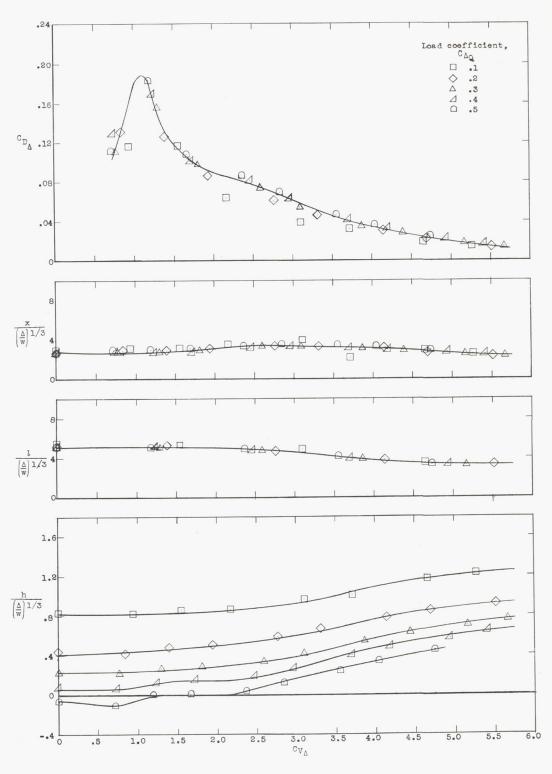
(c) Trim, 8° .

Figure 7.- Continued.



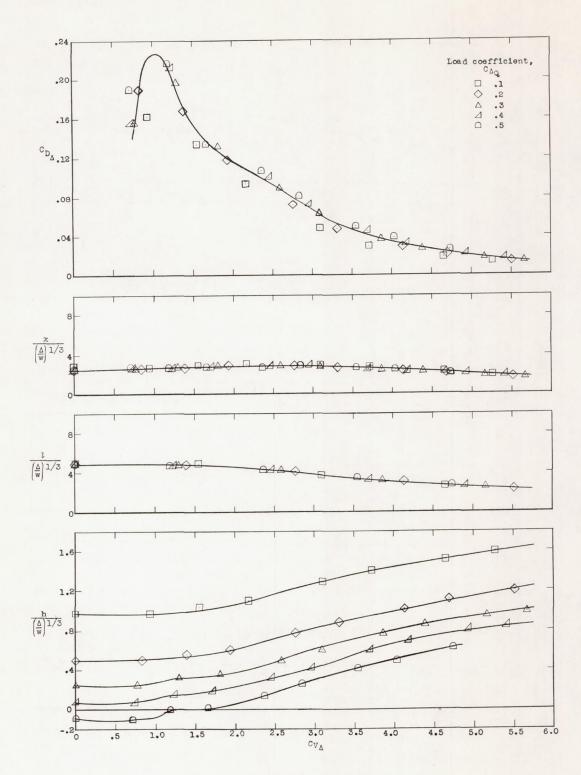
(d) Trim, 12°.

Figure 7.- Continued.



(e) Trim, 16° .

Figure 7.- Continued.



(f) Trim, 20°.

Figure 7.- Concluded.

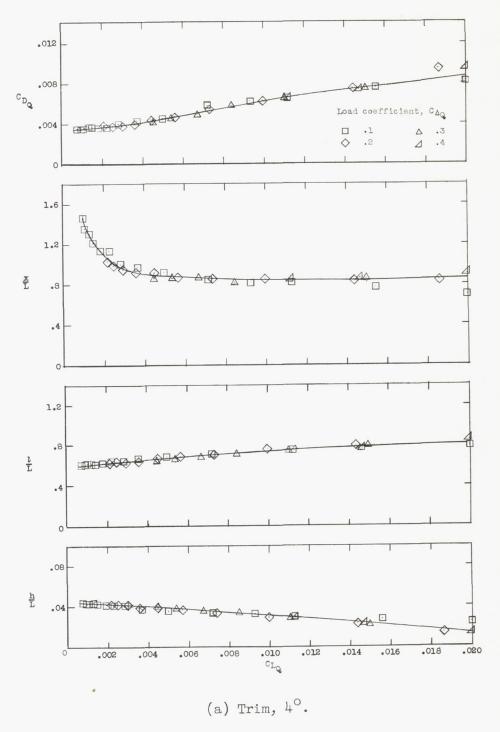
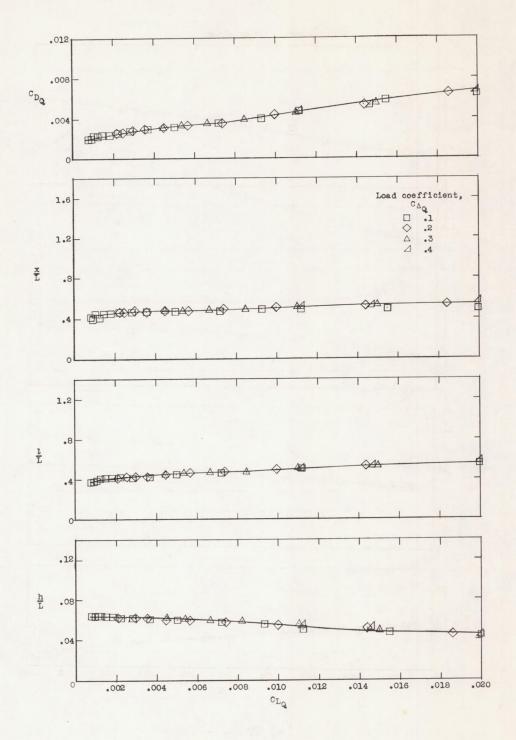
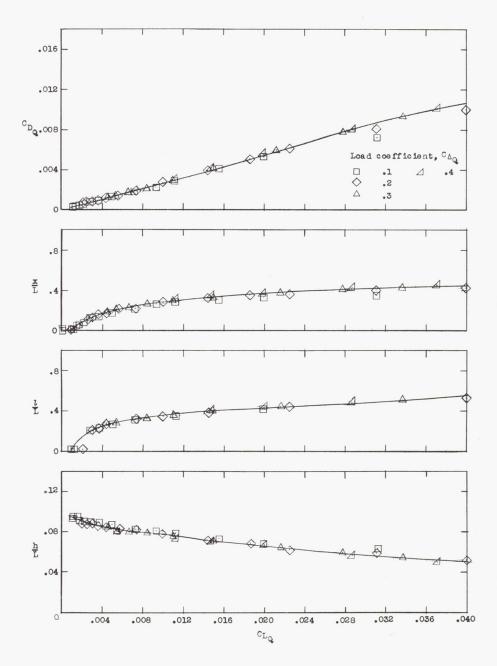


Figure 8.- Hydrodynamic characteristics of model with chine strips. Fineness ratio 9; planing condition.



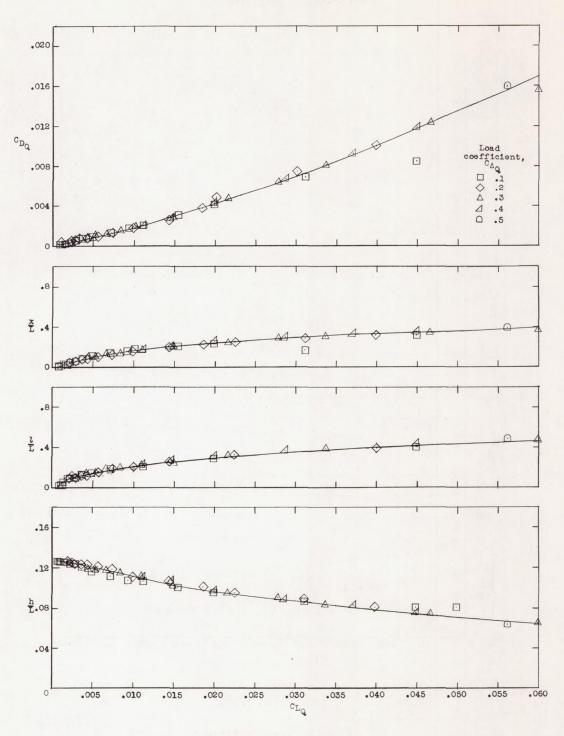
(b) Trim, 8°.

Figure 8.- Continued.



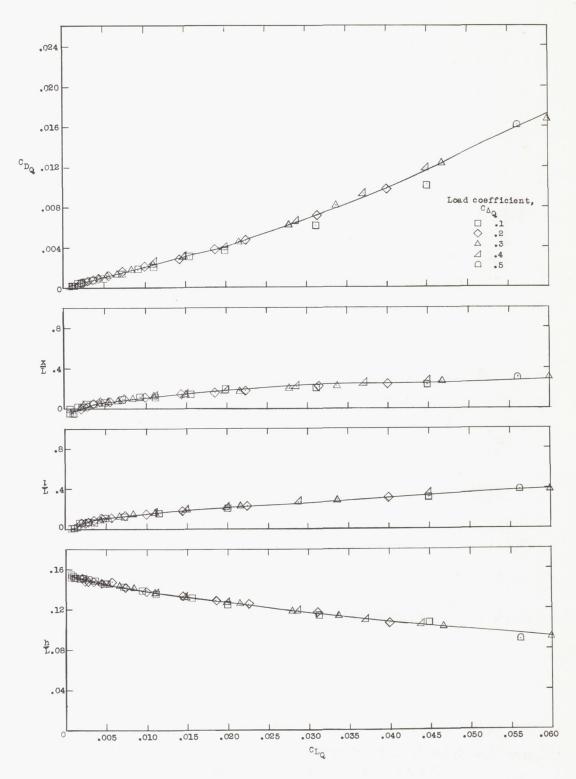
(c) Trim, 12⁰.

Figure 8.- Continued.



(d) Trim, 16°.

Figure 8.- Continued.



(e) Trim, 20° .

Figure 8.- Concluded.

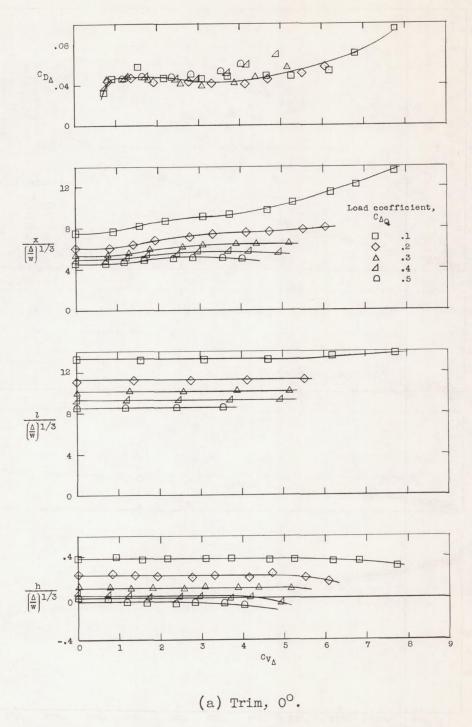
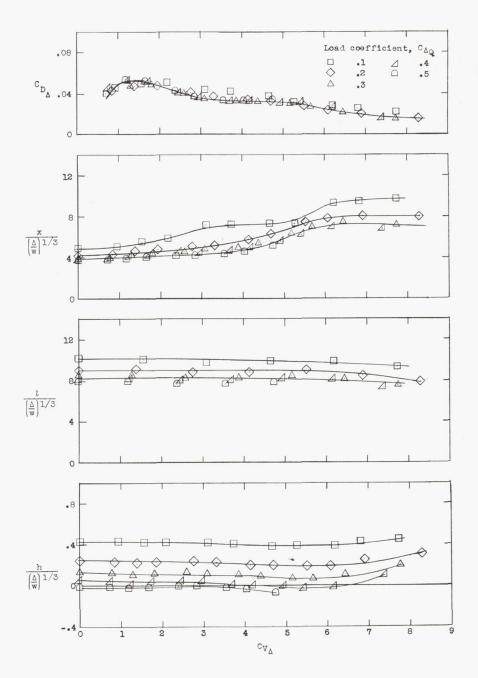


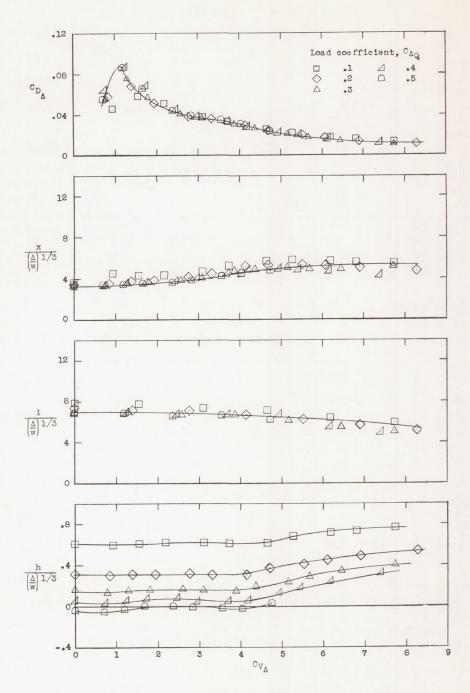
Figure 9.- Hydrodynamic characteristics of model with chine strips.

Fineness ratio 12; displacement condition.



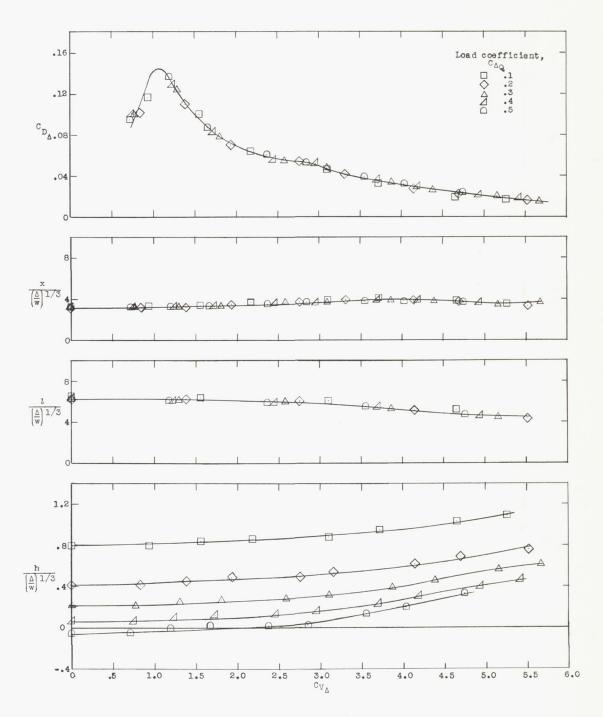
(b) Trim, 4°.

Figure 9.- Continued.



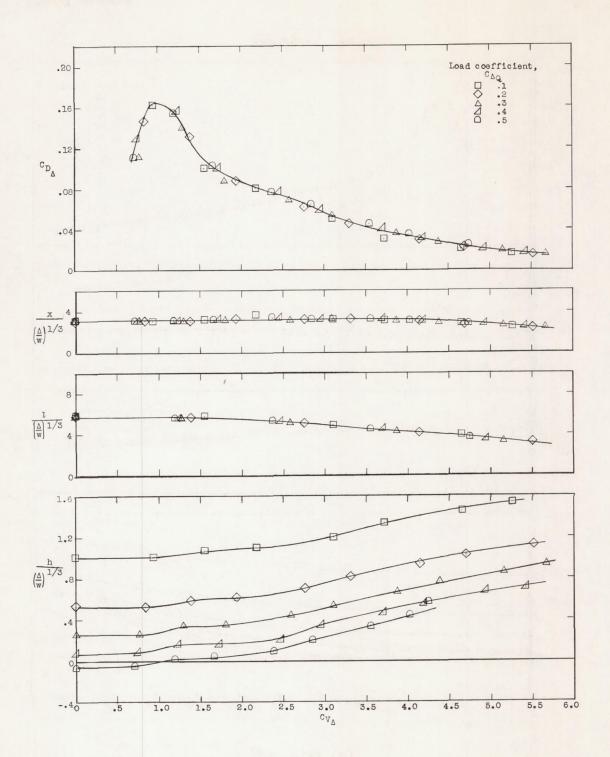
(c) Trim, 8°.

Figure 9.- Continued.



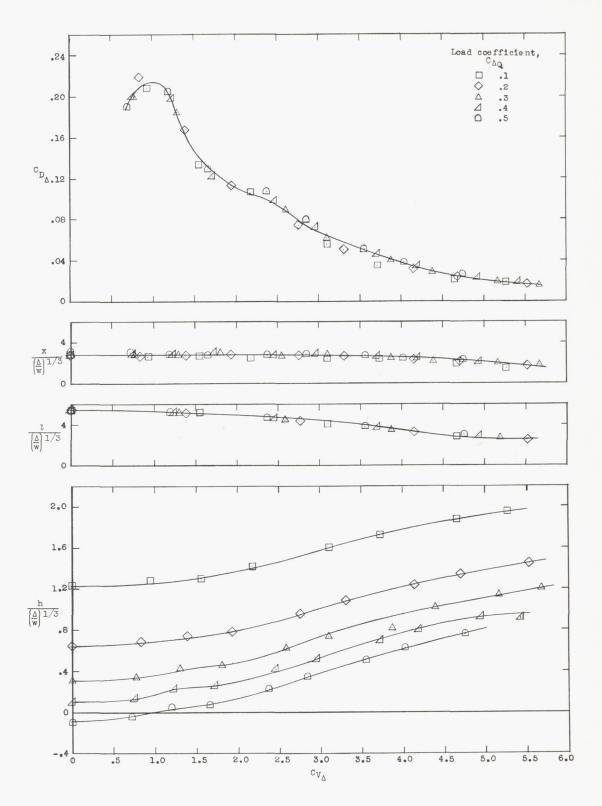
(d) Trim, 12°.

Figure 9.- Continued.



(e) Trim, 16°.

Figure 9.- Continued.



(f) Trim, 20° .

Figure 9.- Concluded.

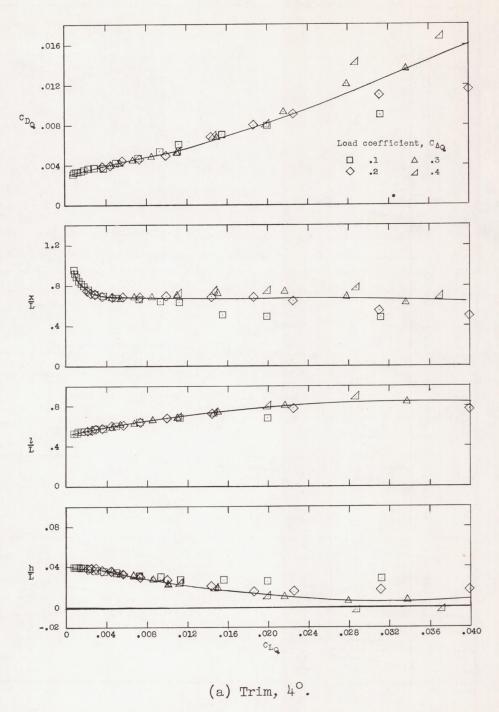
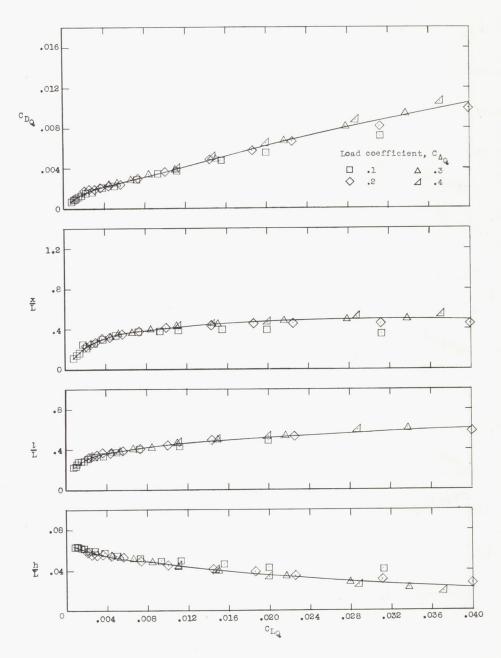


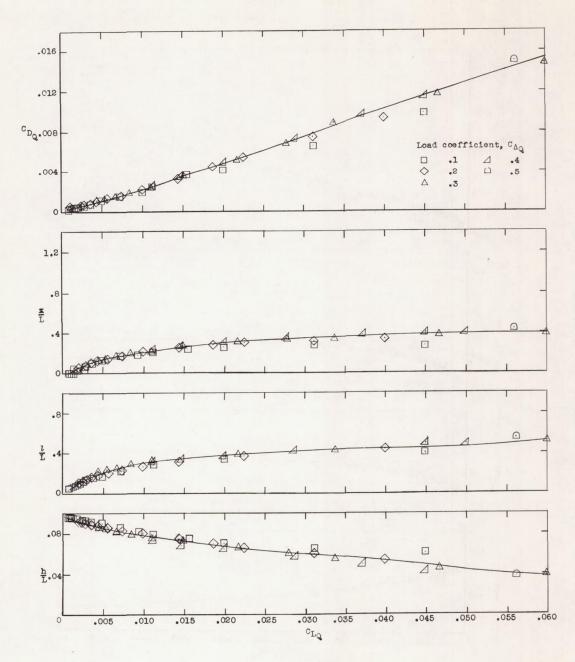
Figure 10.- Hydrodynamic characteristics of model with chine strips.

Fineness ratio 12; planing condition.



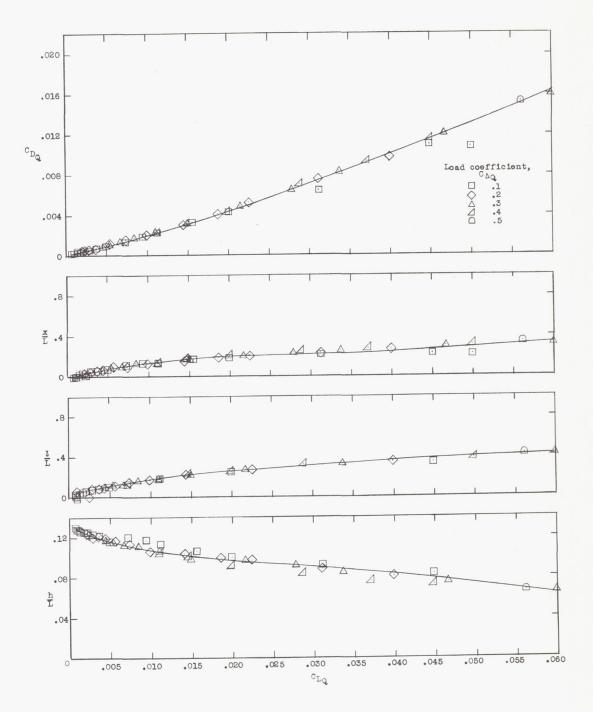
(b) Trim, 8° .

Figure 10.- Continued.



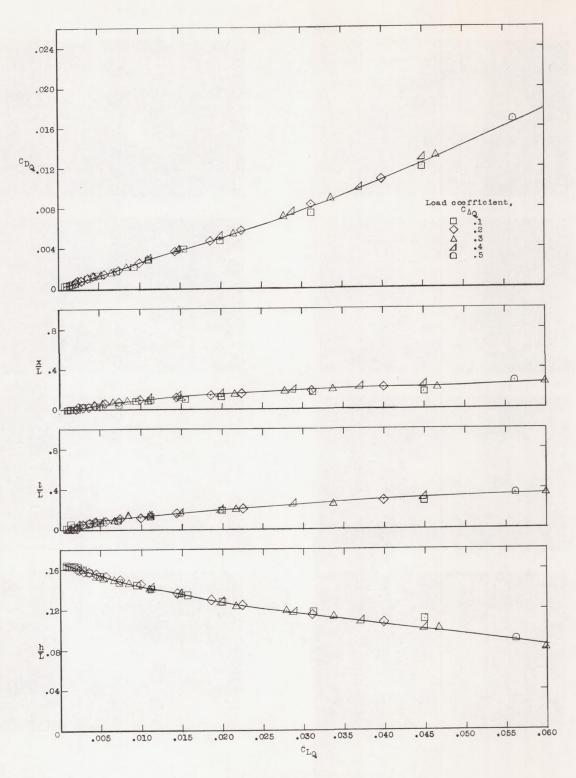
(c) Trim, 12°.

Figure 10.- Continued.



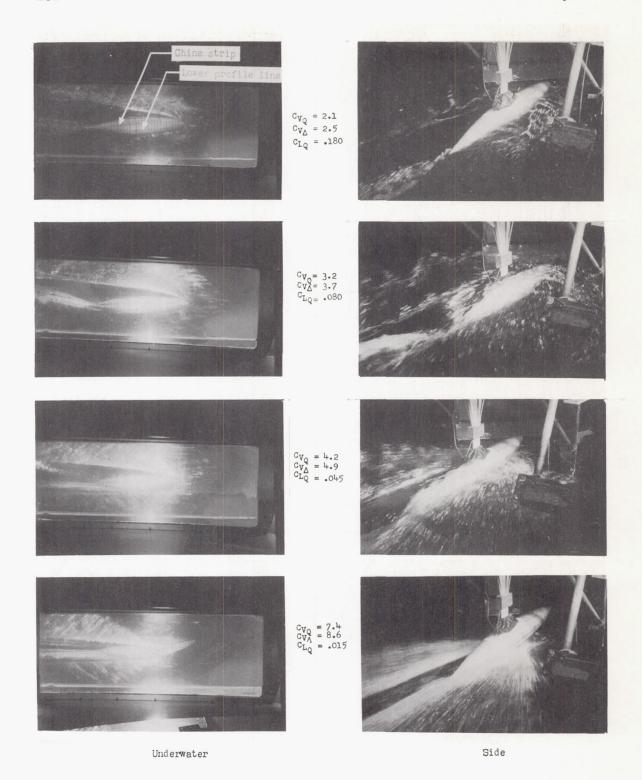
(d) Trim, 16°.

Figure 10.- Continued.



(e) Trim, 20°.

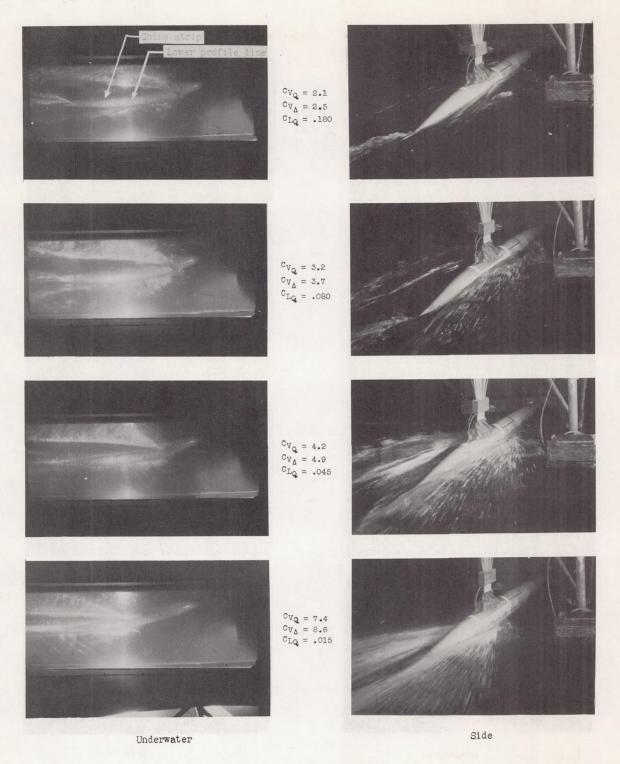
Figure 10.- Concluded.



(a) Fineness ratio 6.

L-86475

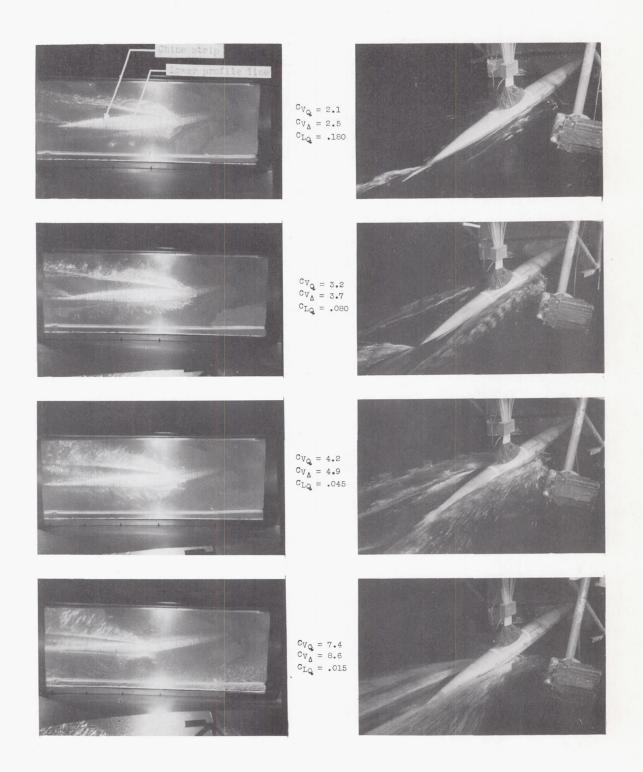
Figure 11.- Spray characteristics of model with chine strips. Trim, 8° ; load coefficient $C_{\Delta_Q} = 0.4$.



(b) Fineness ratio 9.

Figure 11.- Continued.

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(c) Fineness ratio 12.

Figure 11.- Concluded.

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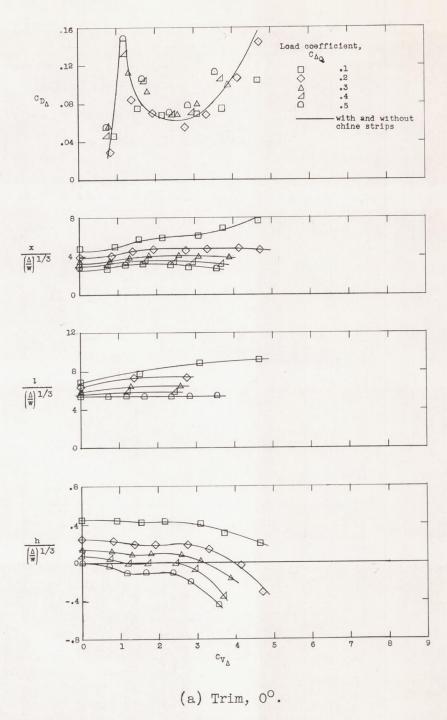


Figure 12.- Hydrodynamic characteristics of models without chine strips.

Fineness ratio 6; displacement condition.

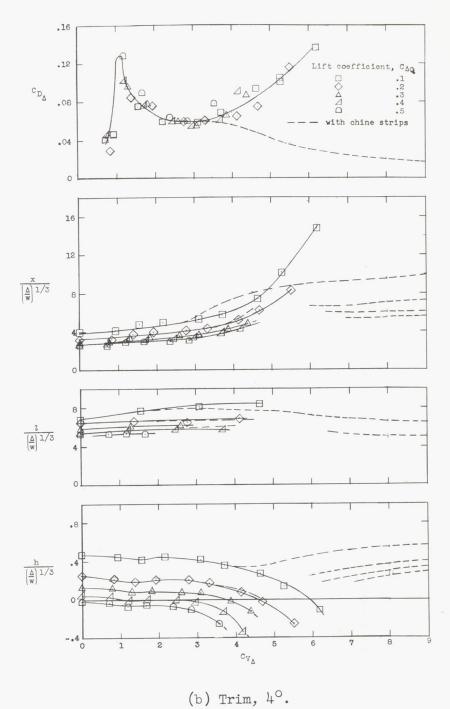


Figure 12. - Continued.

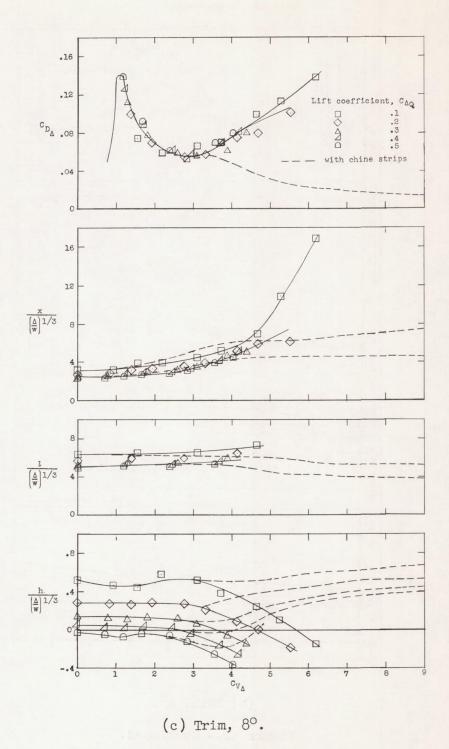
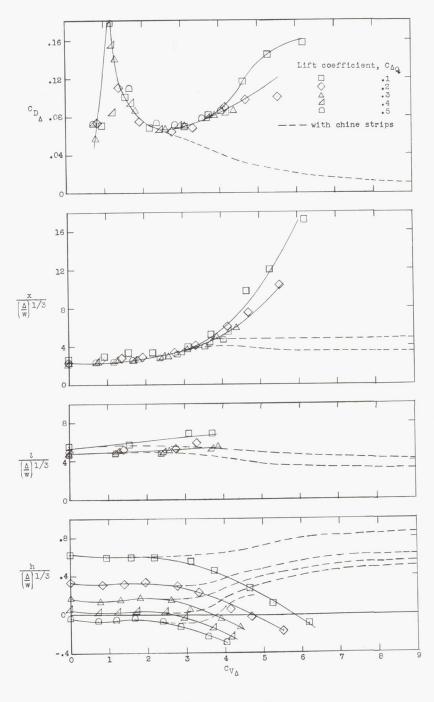


Figure 12.- Continued.



(d) Trim, 12°.

Figure 12.- Continued.

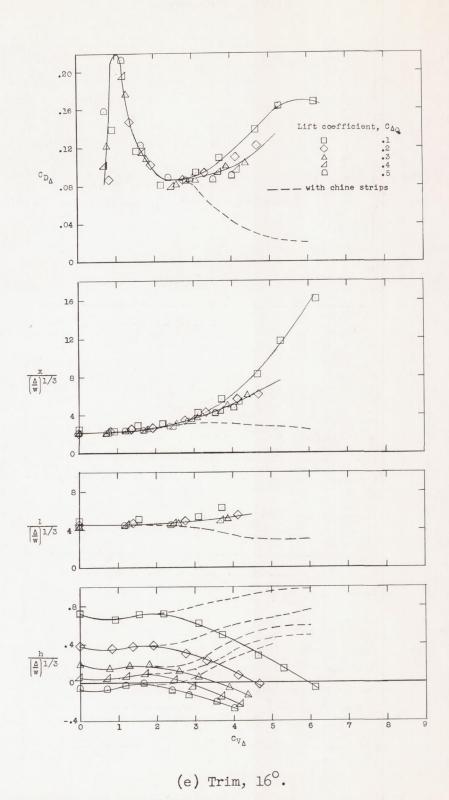


Figure 12.- Continued.

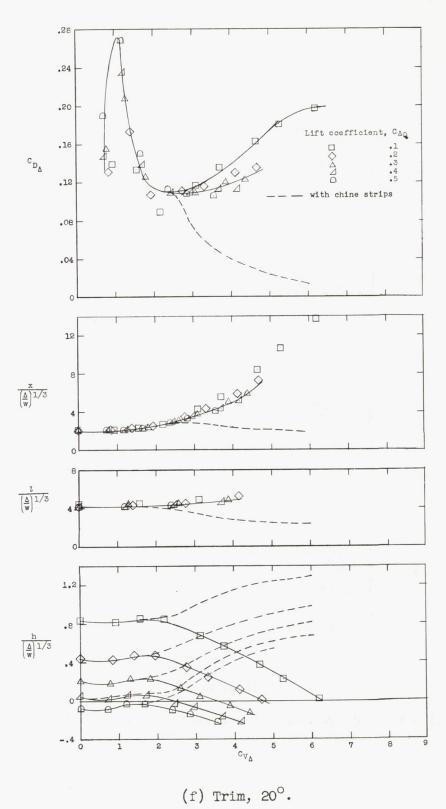


Figure 12.- Concluded.

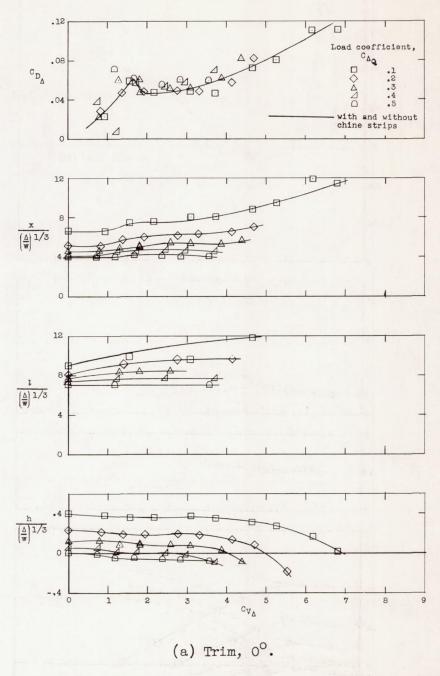
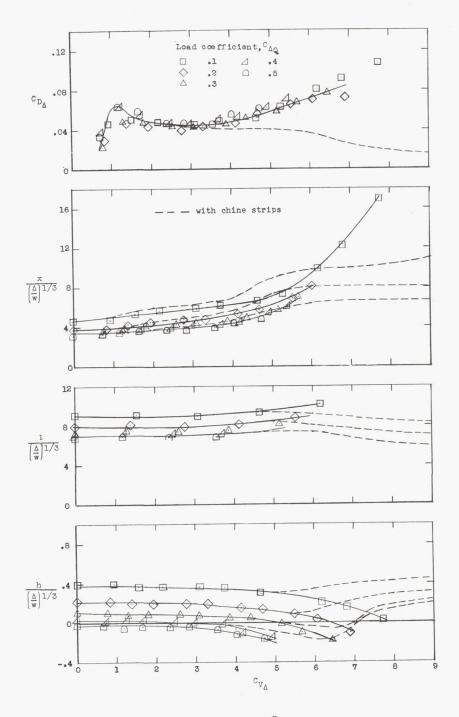


Figure 13.- Hydrodynamic characteristics of models without chine strips.

Fineness ratio 9; displacement condition.

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(b) Trim, 4°.

Figure 13.- Continued.

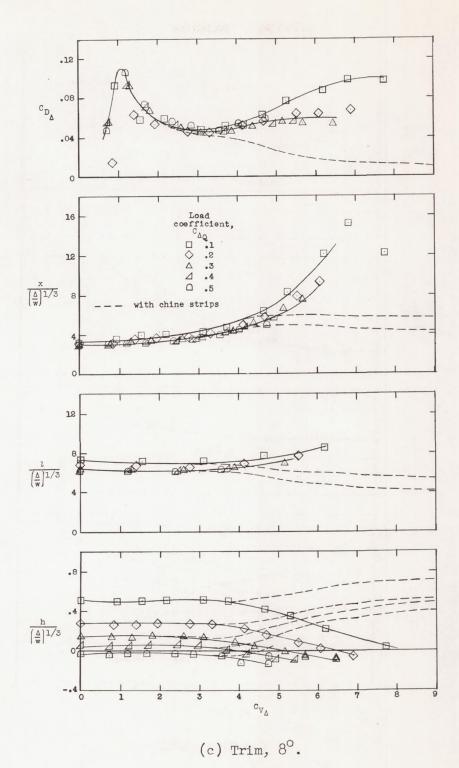
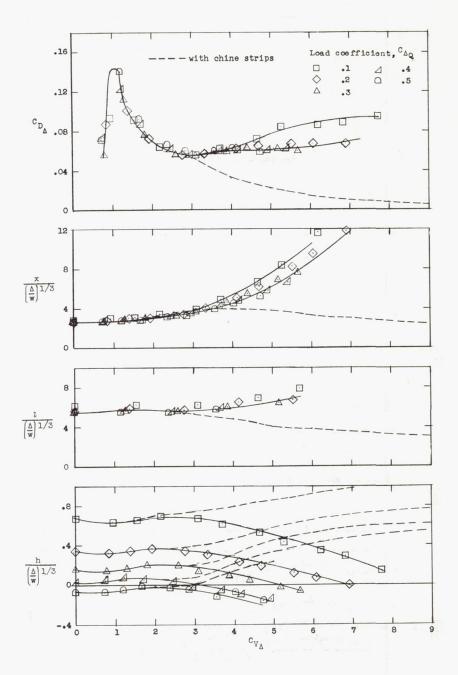
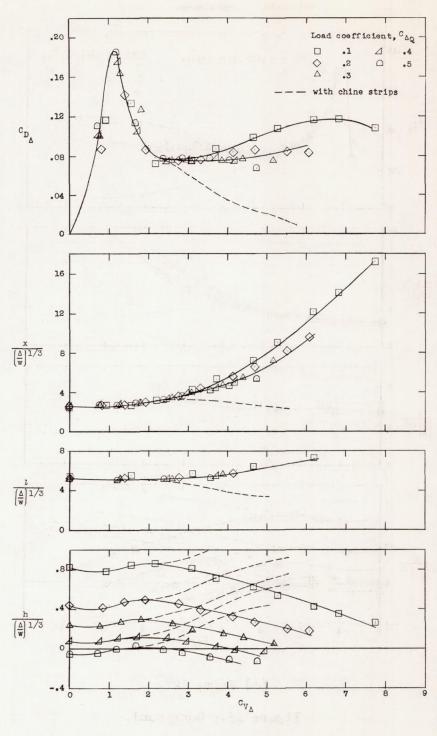


Figure 13.- Continued.



(d) Trim, 12°.

Figure 13.- Continued.



(e) Trim, 16°.

Figure 13.- Continued.

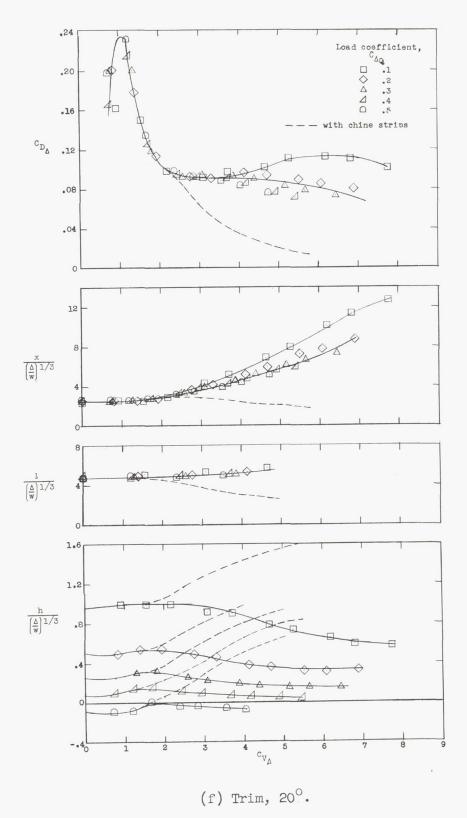


Figure 13.- Concluded.

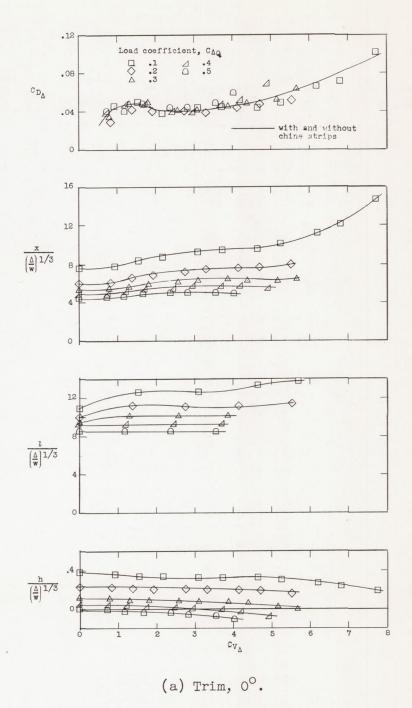


Figure 14.- Hydrodynamic characteristics of models without chine strips.

Fineness ratio 12; displacement condition.

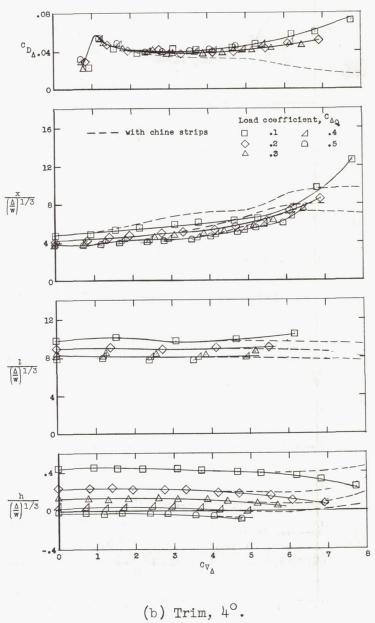


Figure 14.- Continued.

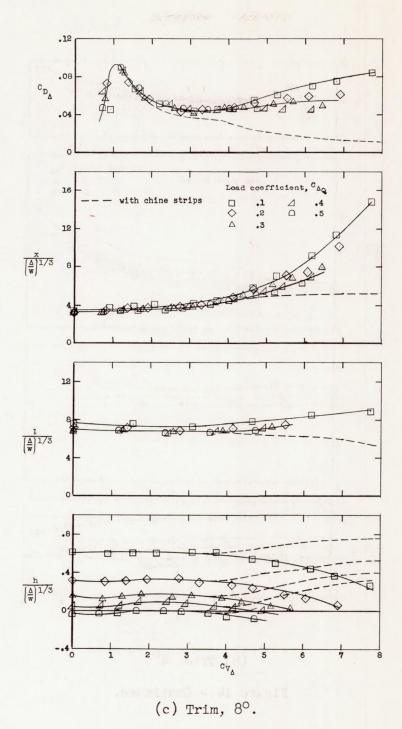
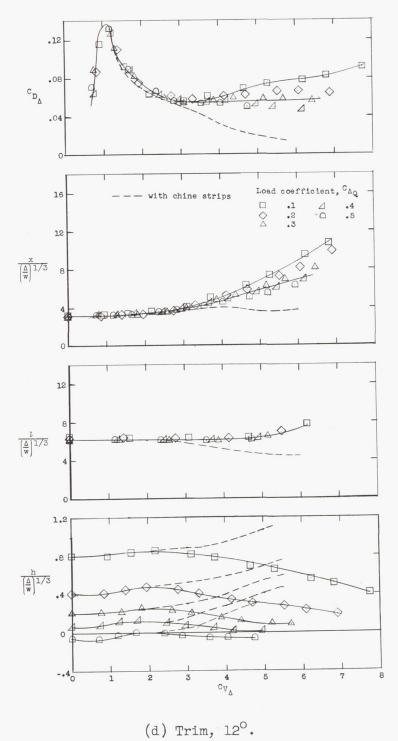
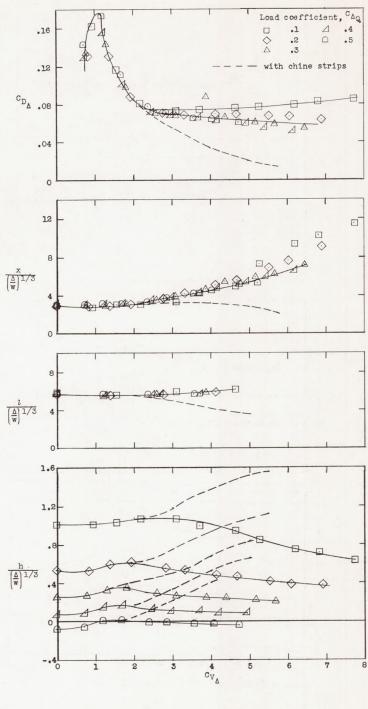


Figure 14.- Continued.



(-, ---)

Figure 14.- Continued.



(e) Trim, 16° .

Figure 14.- Continued.

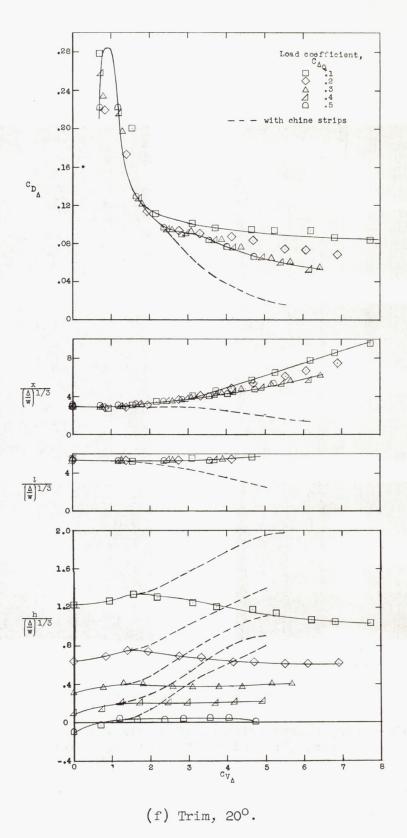
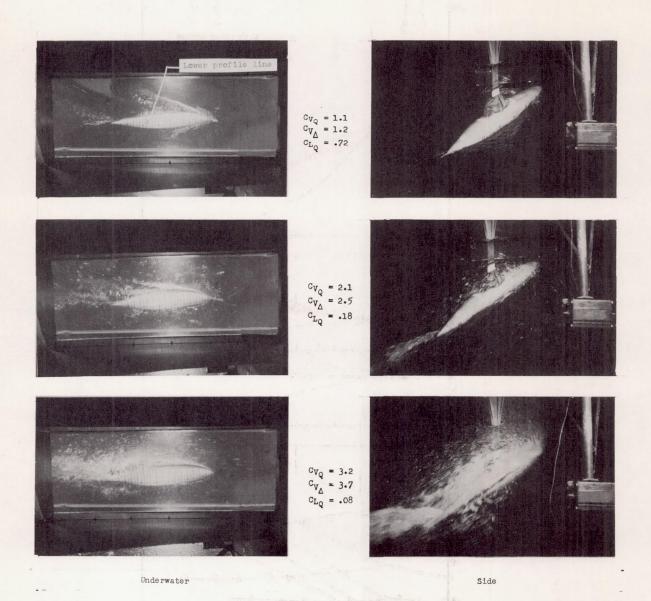


Figure 14.- Concluded.



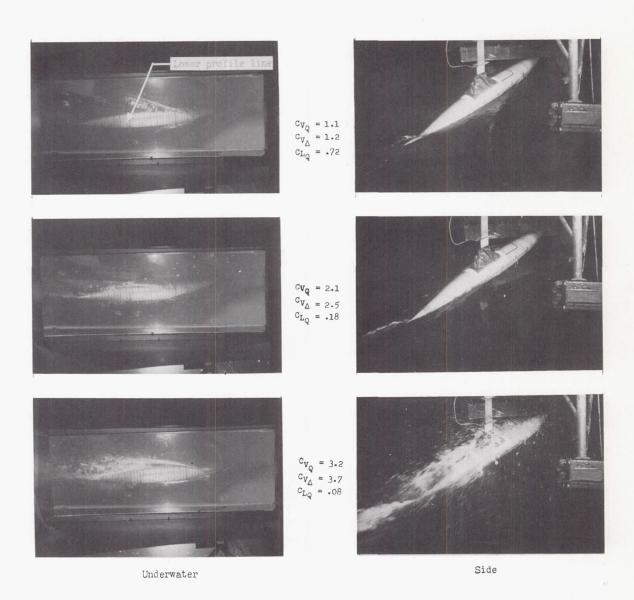
(a) Fineness ratio 6.

L-86478

Figure 15.- Spray characteristics of models without chine strips. Trim, $8^{\rm o}$; load coefficient ${\rm C}_{\Delta_{\rm Q}}$ = 0.4.

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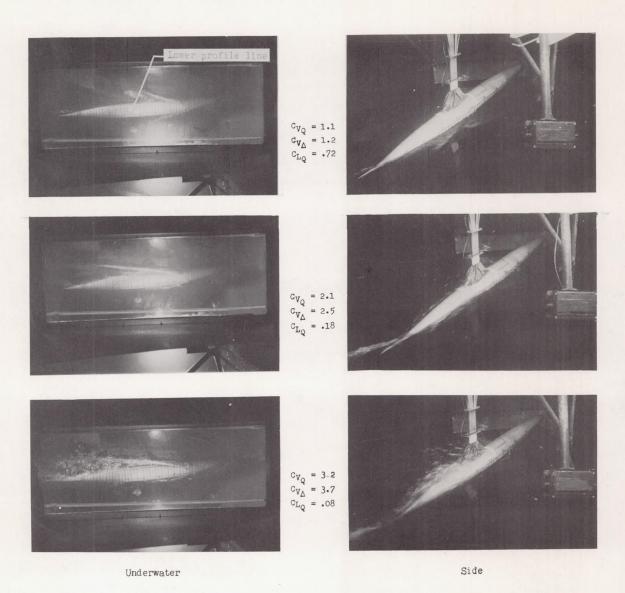
Figure 14. - Comeluded.



(b) Fineness ratio 9.

Figure 15.- Continued.

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(c) Fineness ratio 12.

Figure 15.- Concluded.

L-86480

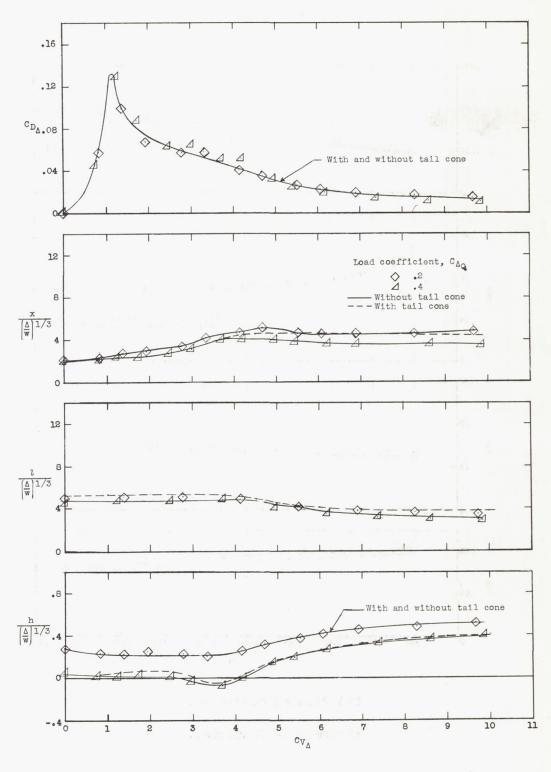
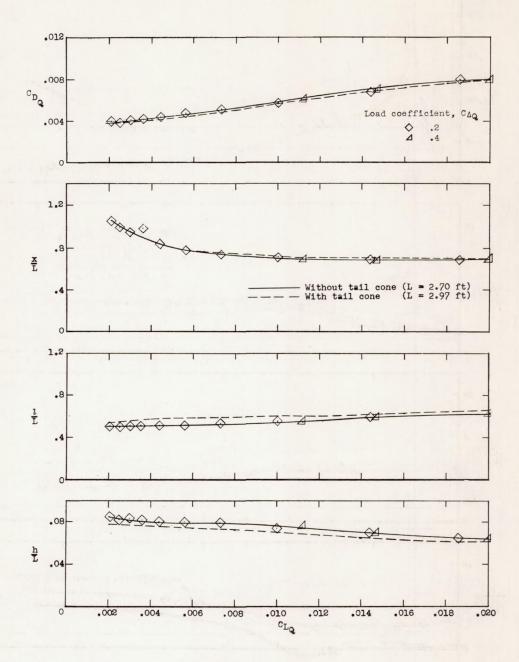


Figure 16.- Hydrodynamic characteristics of models with chine strips but with the tail cones removed. Fineness ratio 6; trim, 8° .



(b) Planing condition.

Figure 16.- Concluded.

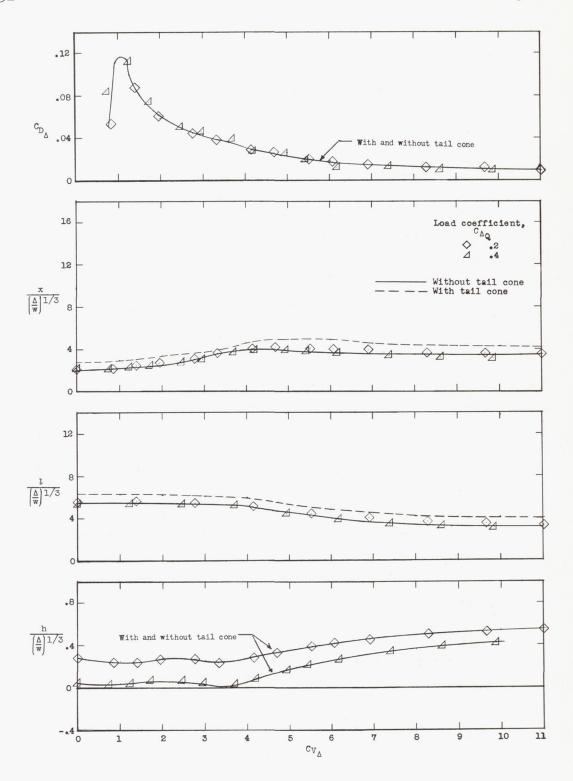
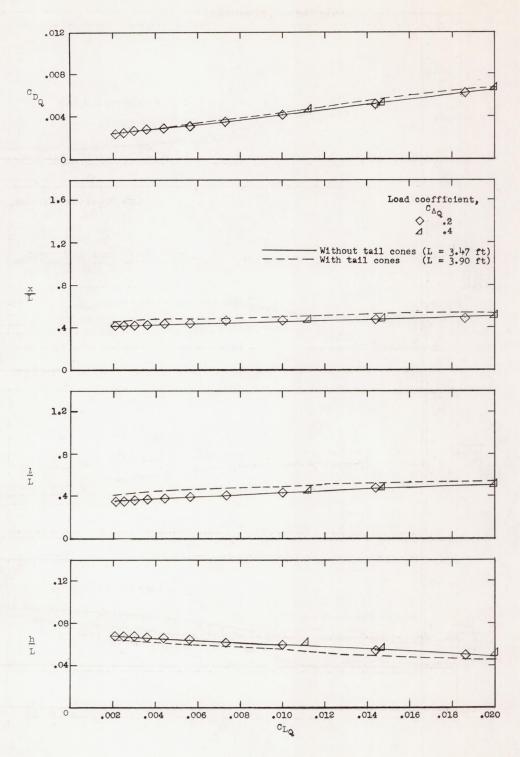


Figure 17.- Hydrodynamic characteristics of models with chine strips but with the tail cones removed. Fineness ratio 9; trim, 8° .



(b) Planing condition.

Figure 17.- Concluded.

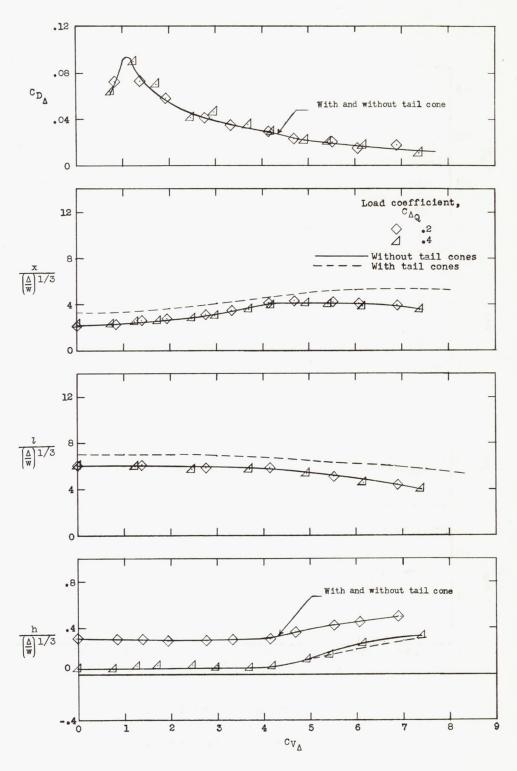


Figure 18.- Hydrodynamic characteristics of models with chine strips but with the tail cone removed. Fineness ratio 12; trim, 80.

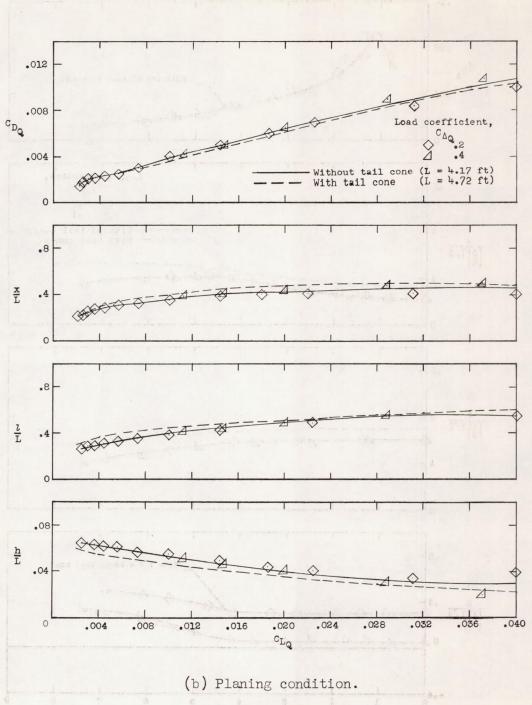
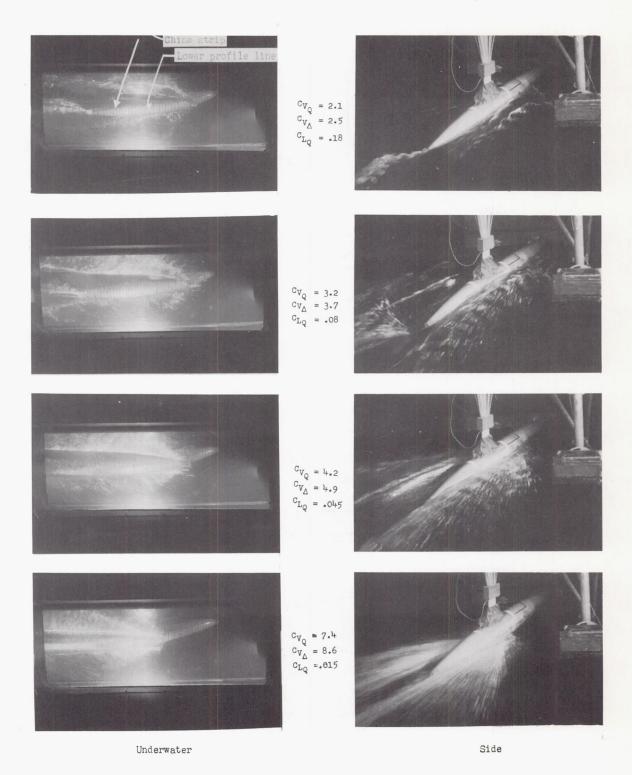


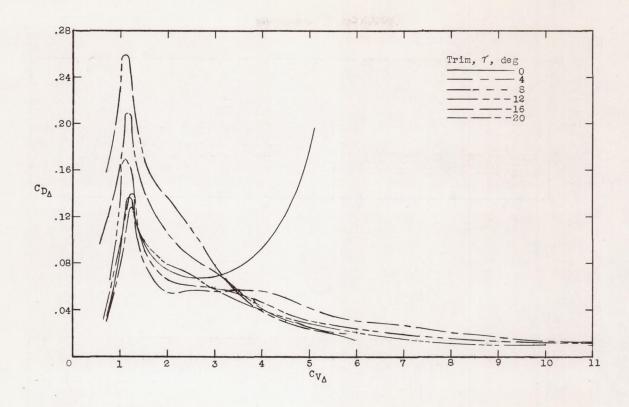
Figure 18.- Concluded.

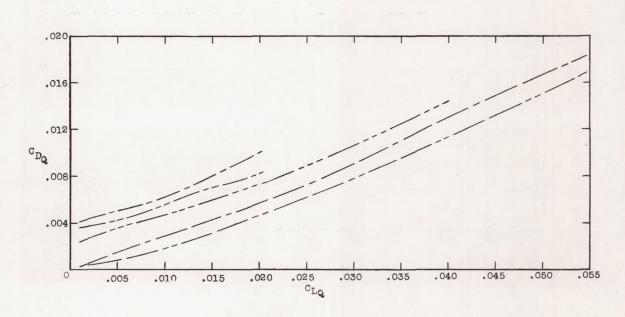
Figure 13. - Hydrodynamic characteristics of models with chine strips but



L-86481

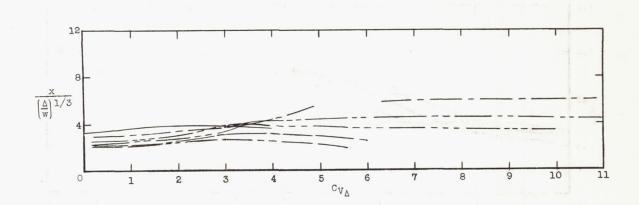
Figure 19.- Spray characteristics of model with chine strips but with the tail cone removed. Fineness ratio, 9; trim, 8°; load coefficient C_{Δ_Q} = 0.4.

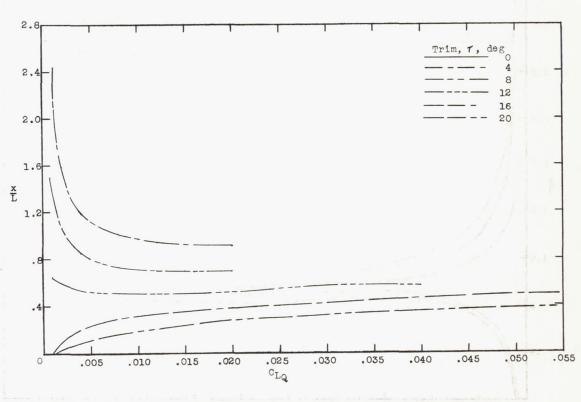




(a) Resistance.

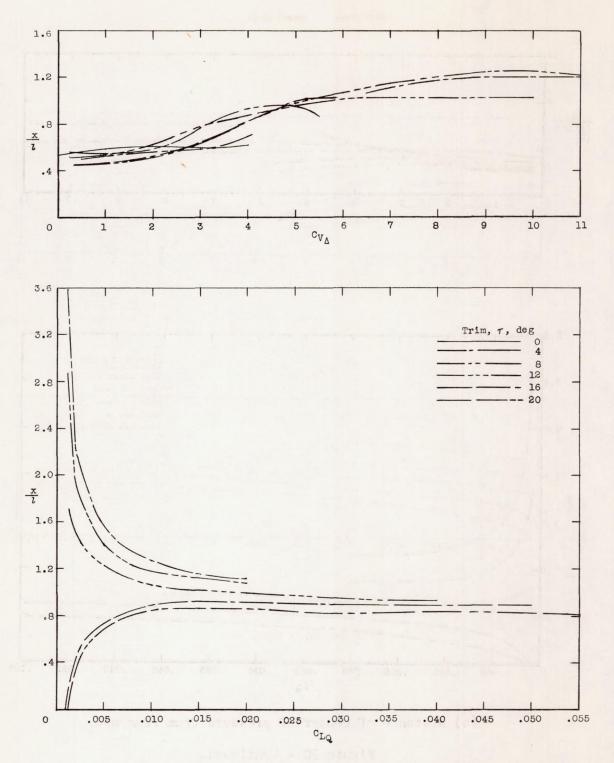
Figure 20.- Effect of trim on hydrodynamic characteristics of model with chine strips. Fineness ratio 6.





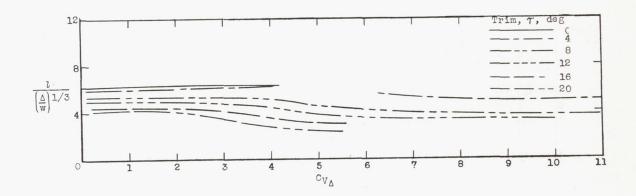
(b) Distance of center of pressure from rear end.

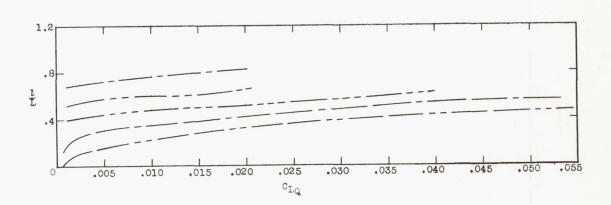
Figure 20.- Continued.



(c) Ratio of center of pressure to wetted length.

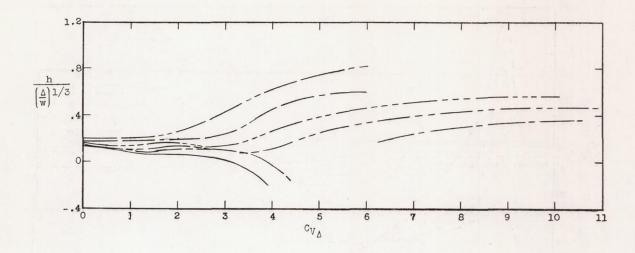
Figure 20.- Continued.

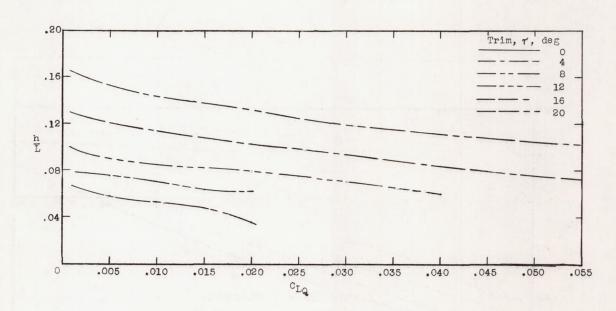




(d) Wetted length.

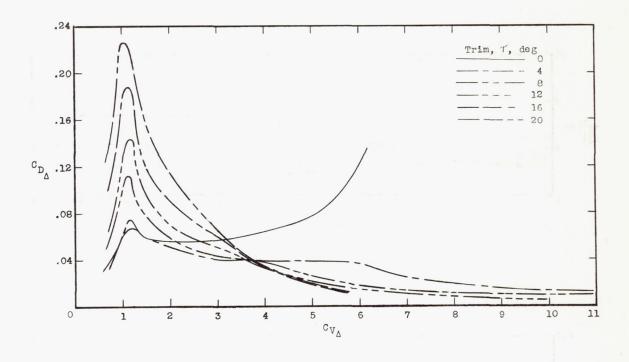
Figure 20.- Continued.

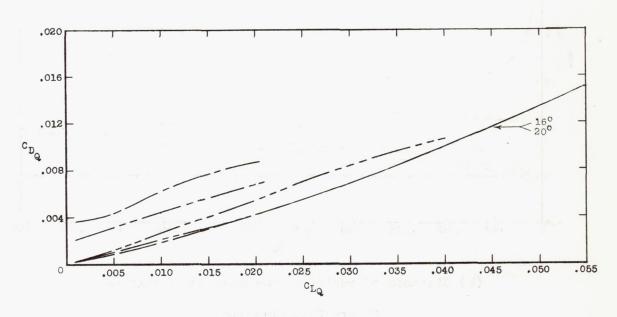




(e) Height of center-line midpoint.

Figure 20.- Concluded.





(a) Resistance.

Figure 21.- Effect of trim on hydrodynamic characteristics of model with chine strips. Fineness ratio 9.

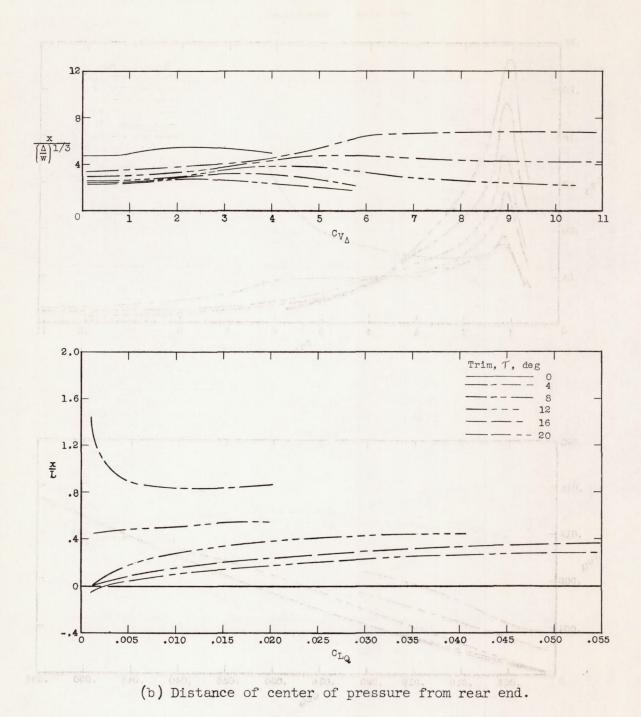
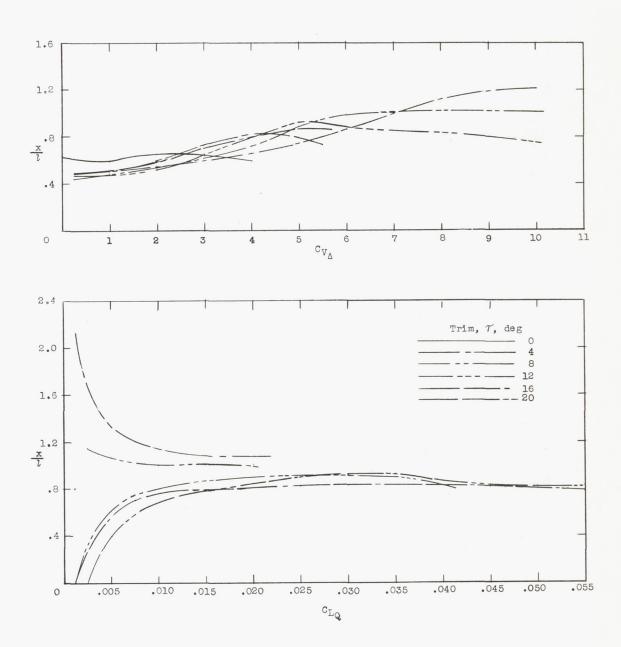
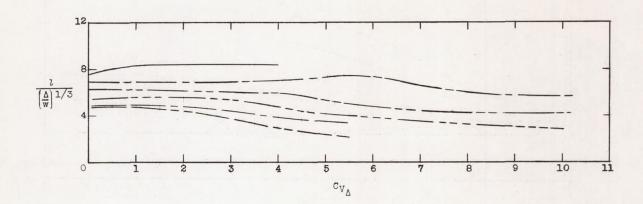


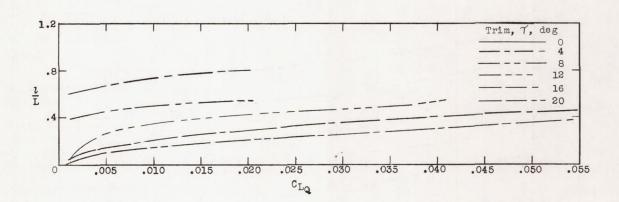
Figure 21.- Continued.

Thurs 21.- Effect of tutm on hydrodynamic characteristics of model with chine strips. Fineness rutto 9.



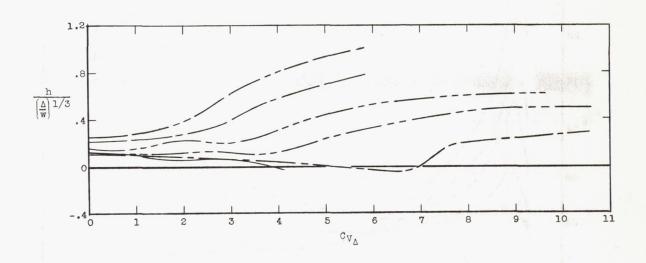
(c) Ratio of center of pressure to wetted length.
Figure 21.- Continued.

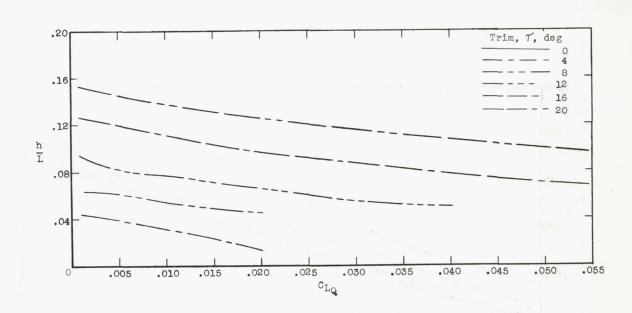




(d) Wetted length.

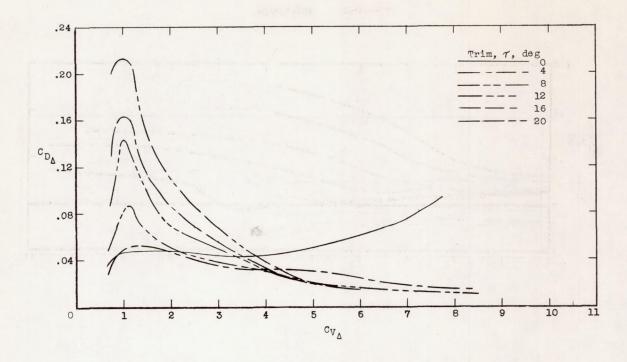
Figure 21.- Continued.

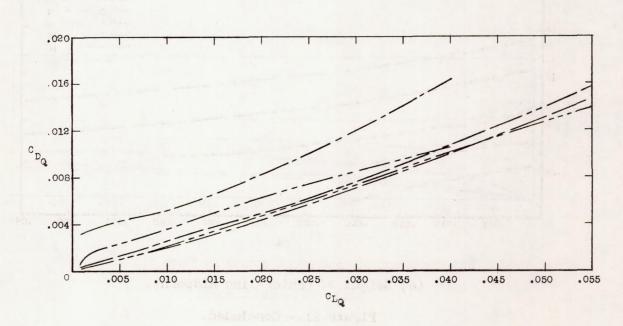




(e) Height of center-line midpoint.

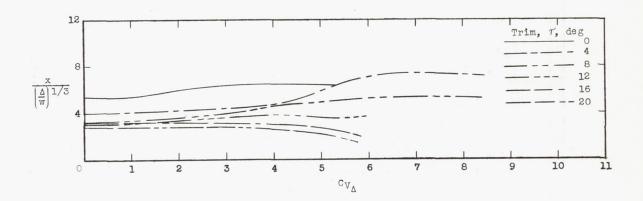
Figure 21.- Concluded.

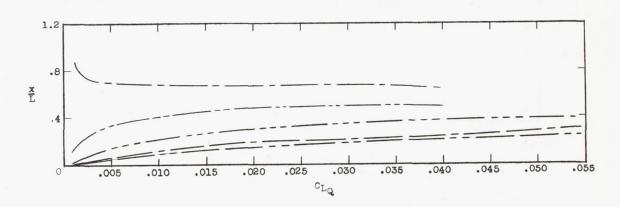




(a) Resistance.

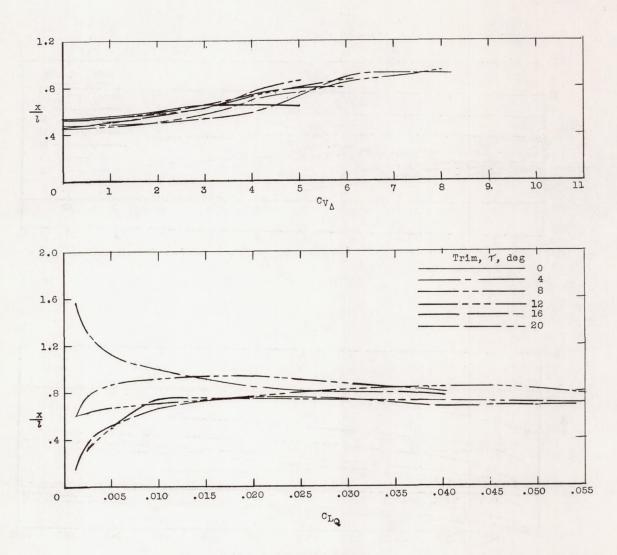
Figure 22.- Effect of trim on hydrodynamic characteristics of model with chine strips. Fineness ratio 12.





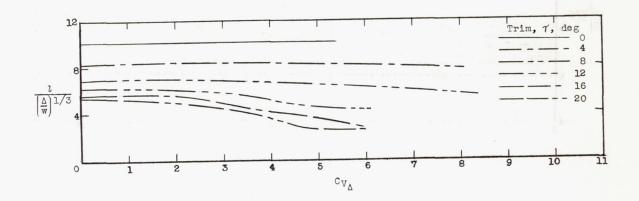
(b) Distance of center of pressure from rear end.

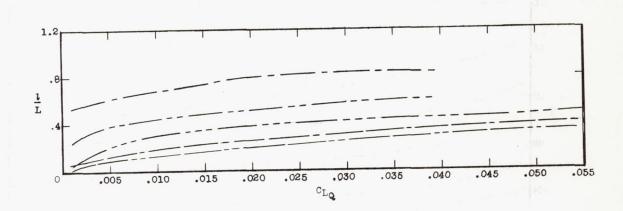
Figure 22.- Continued.



(c) Ratio of center of pressure to wetted length.

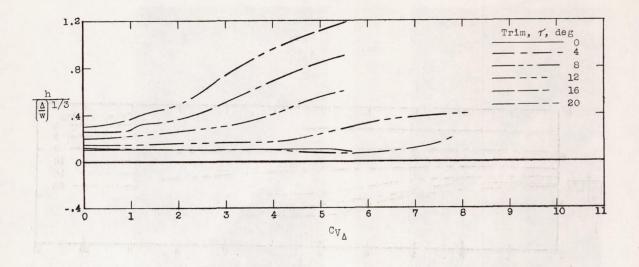
Figure 22.- Continued.

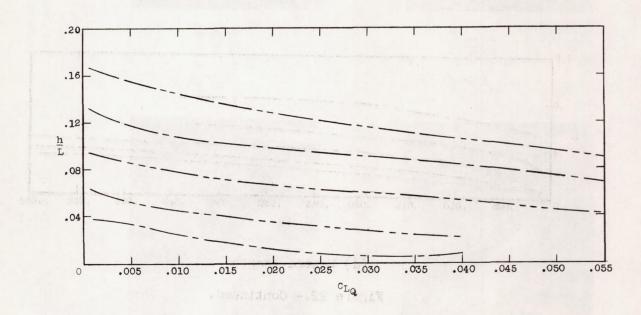




(d) Wetted length.

Figure 22.- Continued.



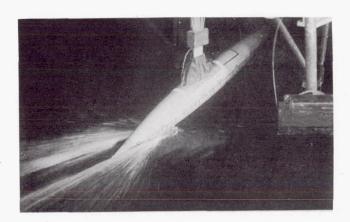


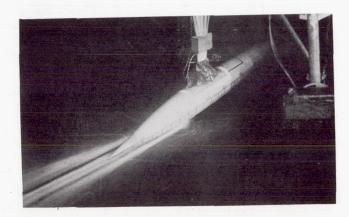
(e) Height of center-line midpoint.

Figure 22.- Concluded.



 $C_{V_Q} = 7.4$ $C_{\Delta_Q} = 0.4$ $C_{V_\Delta} = 8.6$ $C_{L_Q} = .015$





Trim, 80



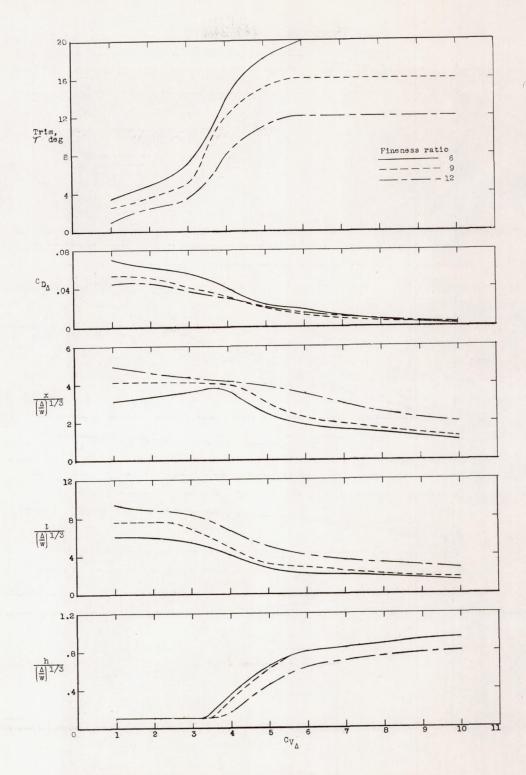




Trim, 16°

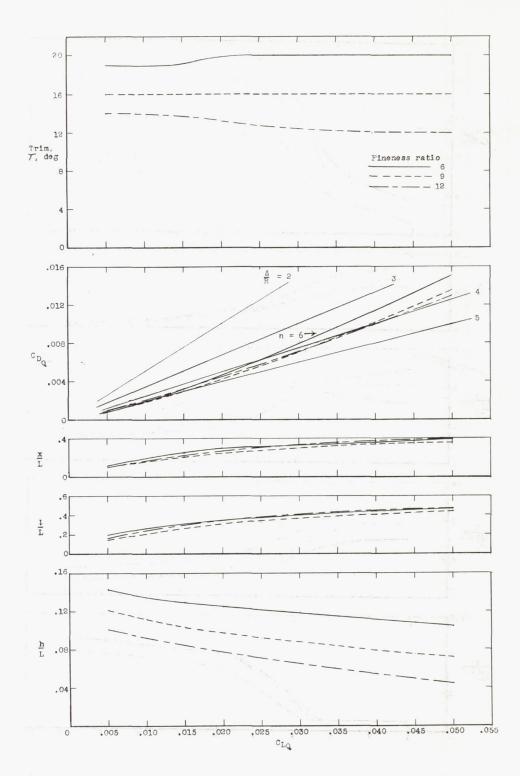
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Figure 23.- Effect of trim on the spray characteristics of model with chine strips. Fineness ratio 9.



(a) Displacement speed range. $C_{\Delta Q} = 0.3$.

Figure 24.- Effect of fineness ratio on the hydrodynamic characteristics of the models with chine strips at best trim (trim for minimum hydrodynamic resistance).



(b) Planing speed range.

Figure 24.- Concluded.

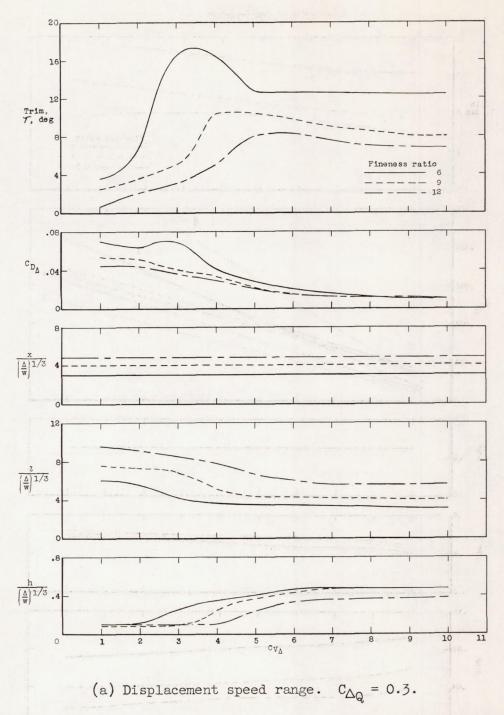
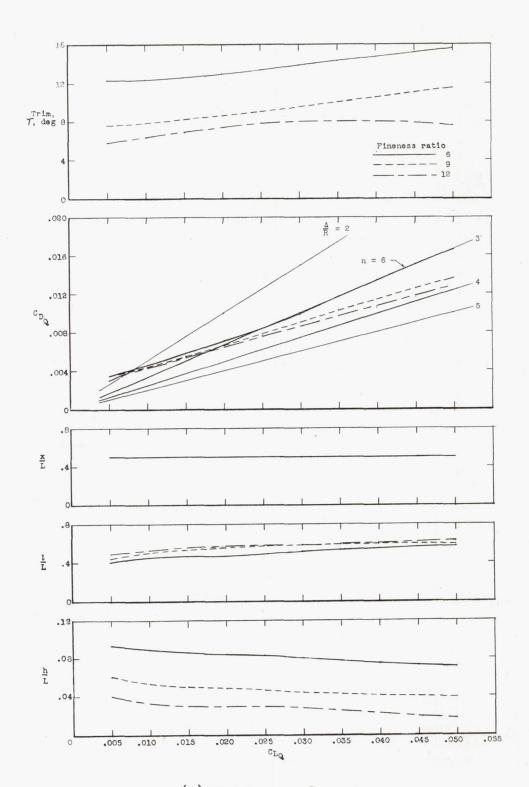


Figure 25.- Effect of fineness ratio on the hydrodynamic characteristics of the models with chine strips for M=0 (hydrodynamic trimming moment about the midpoint of the center line equals zero).

Pigure 25 .- Concluded.



(b) Planing speed range.

Figure 25.- Concluded.

Fineness ratio 12

Fineness ratio 6 $(\texttt{C}_{V_{\overline{\mathbb{Q}}}} = 7.4; \quad \texttt{C}_{\Delta_{\overline{\mathbb{Q}}}} = .4; \quad \texttt{C}_{V_{\Delta}} = 8.6; \quad \texttt{C}_{L_{\overline{\mathbb{Q}}}} = .015)$ $(C_{V_Q} = 13.7; C_{\Delta_Q} = .2; C_{V_\Delta} = 17.9; C_{L_Q} = .002)$

Fineness ratio 9

L-86483 Figure 26.- Effect of fineness ratio on spray characteristics of models with chine strips. Trim, 8° .